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SOLVENT ABUSE

An annotated bibliography with
additional related citations

ADDICTION RESEARCH FOUNDATION BIBLIOGRAPHIC SERIES

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Solvent Abuse: An Annotated Bibliography with Additional Related Citations	(1973)	

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SOLVENT ABUSE

An annotated bibliography with
additional related citations

Compiled at the
Addiction Research Foundation Library

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and edited by

R. J. Hall

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CONTENTS

Preface.....	vii
Introduction.....	ix
Bibliography.....	1
Appendix: Related Citations.....	151
Key Word Index.....	201
Author Index.....	217
Substance Index.....	227

PREFACE

Solvent abuse appears to be a fad which always has the potential of becoming an important community health problem. This bibliography is a collection of references dealing with the numerous aspects involved in the abuse of solvents, including gasoline and anesthetics. In addition, related material is presented on accidental overexposure and its treatment, as well as experimental studies on the toxicity of these substances. It is intended for use by researchers, educators, and students interested in the problem and serves as a major reference work in this field of study.

Every effort has been made to make this work as complete as possible and updating is planned as required by the publishing activity.

It is hoped that microfiche of each of the articles (excluding theses or book chapters) will be available at the time of publication of this volume. At the top of each 4"x6" microfiche, the complete citation appears in eye-readable type and a 16mm microfilm of the complete article follows. A combination of the bibliography and microfiche will give the user the opportunity of selecting and reading the full text of articles which are relevant to him.

In completing a work of this type, it has been necessary for the compilers to devote a great deal of time and expend much energy. In addition, it has been necessary to achieve the complete cooperation of the Library staff without which this bibliography may not have been completed.

July 1, 1973.
ARL, Toronto

R. J. Hall
Librarian.

INTRODUCTION

Aim

The aim of this bibliography is to provide a means of access to a comprehensive collection of papers which have been produced on the topic of solvent abuse.

In meeting this objective, it was decided to index and annotate those articles which dealt with the specific intentional abuse by inhalation of solvents, and to index and list those articles which dealt with accidental overexposure or other pertinent aspects of solvents.

Included in the scope of the bibliography are references to articles dealing with the abuse of substances by inhalation. The substances include a wide variety of solvents, as well as anesthetics and gasoline. The range of literature includes research studies, clinical reports, review articles, letters to the editor, and commentaries of all types.

Types of Information

A. Citations

Items are arranged alphabetically by senior author. The references include the usual bibliographic data, as well as index terms and an accession (microfiche) number. As previously mentioned, the items in the first section also include a short annotation.

B. Key Word Index

An alphabetical key word listing (pages 201-202) permits the user to select the terms which are relevant to his needs. The number beside each key word refers him to the Key Word Index (pages 203-216) where terms are grouped under appropriate headings accompanied by a list of corresponding bibliography numbers or appendix numbers (prefaced with the letter A) which directs him to the appropriate citations.

C. Author Index

The name of each author represented in the bibliography is listed alphabetically (pages 217-226), and the citation numbers follow. An underlined number indicates that the author is the senior author for the particular item. Again, the appendix citation numbers are prefaced with the letter A.

D. Substance Index

Substances, group names, and products which are discussed in the cited articles are listed alphabetically with corresponding numbers (bibliography and/or appendix) on pages 227-231, along with appropriate cross references.

E. Language Abbreviations

The first item of the key word section of each citation represents the language of the paper. The following are the abbreviations which have been used:

C - Czechoslovakian	I - Italian
D - Dutch	J - Japanese
Da - Danish	N - Norwegian
E - English	Po - Polish
F - French	S - Swedish
Fi - Finnish	Sp - Spanish
G - German	

Using the Indexes

To facilitate the combination of indexing terms, it is often helpful to photocopy the page containing one of the chosen terms and use it to compare (by circling relevant numbers) with the numbers listed beside the second term.

It is important to remember that sequential numbering is represented by a hyphen. For example, 122-125 represents citation numbers 122, 123, 124 and 125.

1. Ackerly, W. C., and Gibson, G.
 LIGHTER FLUID "SNIFFING".
 American Journal of Psychiatry (Baltimore), 120(11): 1056-1061
 (17 ref.), 1964.
 E - intentional - gen. - gas. - solvents - humans - child. - adoles.
 - female - male - desc. admin. - intent. inhal. - reg. use - alien.
 - euph. - impair. - cult. depriv. - low. class - courts - juven. -
 recidiv. - probat., rehab. - EEG - ataxia - dizz. - headache -
 nausea - vomit. A-0062.

Reported are twelve cases, ten boys and two girls between the ages of eight and sixteen, who sniffed lighter fluid to the point of intoxication. In most cases, the fluid, which was usually obtained by shoplifting, was poured over a rag and held over the face. There are three types of effects including the subjective effects (euphoria), the objective signs of intoxication (blood-shot eyes, staggering, and uncoordination), and the more severe complications (unconsciousness). In this group of children, there was evidence of sexual activities associated with the sniffing. In three of the twelve cases, there was a progression to alcoholism. All twelve children had been arrested previously for anti-social behavior prior to the sniffing, most had low I. Q. s, prevalent family problems and eleven of them belonged to the Mexican-American ethnic groups. Attempts at controlling the habits of the longstanding "sniffers" meet with little success.

2. Adams, E. W.
 SOME UNUSUAL FORMS OF DRUG ADDICTION.
 British Journal of Inebriety (London), 31(1): 1-15 (29 ref.), 1933.
 E - intentional - gen. - anesth. - humans - adults - female - male
 - intent. inhal. - reg. use - pers. prob. - trans. prob. - psycho-
 ther. - kid., liv. A-1556.

In a presentation concerning unusual forms of drug addiction, brief references are made to cases involving addiction to chloroform, ether, and nitrous oxide. It is said that addiction to chloroform inhalation can result in cirrhosis of the liver and further serious or even fatal complications associated with this condition could arise. Ether inhalation, it was felt, was on the decrease in contrast to the past when it was a common form of addiction. A case is cited, perhaps indicating chloroform abuse, involving a nurse, found insensible in a corridor, lying in a pool of chloroform, with a broken bottle at her side. A reference is made to a man addicted to nitrous oxide, whose sensations and phantasies were described as being extremely pleasurable. He became insane and it was not certain whether this was due to the nitrous oxide or

whether the gas sniffing was just a symptom of his deranged mentality. No conclusion was made.

3. Agnew, L. R. C.
ON BLOWING ONE'S MIND (19TH-CENTURY STYLE). A
MODEST PROPOSAL.
Journal of the American Medical Association (Chicago), 204(1):
159-160 (0 ref.), 1968.
E - intentional - gen. - review - anesth. - humans - adults - in-
tent. inhal. - reg. use - exhil. - euph. B-1945.

An account is given of a nineteenth century book written by an alleged "M. D. " who, among others, suggests the abuse of nitrous oxide as a substitute for alcohol in producing intoxication. It is suggested in this book that nitrous oxide be dispensed in special taverns, from inhaling bags (1 quart to 5 quarts) equipped with mouthpieces. The 'dosages' range from exhilarating through extatic to seraphic. The effects of a seraphic dosage are said to be: "irresistible mirth, exquisite pleasure, sensation of the most agreeable nature, toes, fingers, and ears thrilling... and rapid flow of paradicial ideas". Extatic effects are said to arise within 2 minutes. The author questions the writer's M. D.

4. Al'apin, B. , and Kozłowski, P.
NARKOMANIA TRÓJCHLOROETYLENOWA U OSOBNIKA Z
WCZESNYM ZANIEM MÓZGU. [Trichloroethylene addiction in
a subject with early cerebral atrophy].
Neurologia, Neurochirurgia i Psychiatria Polska (Warsaw), 10(4):
511-514 (8 ref.), 1960.
Po - intentional - gen. - case hist. - solvents - humans - adoles. -
female - intent. inhal. - reg. use - charact. desc. - pers. prob. -
depend. - impair. - deviant. behav. - hosp. - psychother. - EEG
- vomit. A-1557.

After a general discussion of the uses of trichloroethylene, the author reports on a case of rare trichloroethylene addiction in a 19 year old girl. The patient, a problem child with emotional and behavioral difficulties, first experienced "tri" intoxication at the age of 16 after inhaling a liquid used to remove stains. She was brought to a clinic where she was overcome by seizures of the "petit-mal" type. After release, the patient's behavior deteriorated, and an attempt at suicide was made. She was then brought to a psychiatric hospital and her condition improved after treatment with meprobamate. After leaving the hospital she returned to her habit and had to be admitted again to the clinic with a case

of trichloroethylene poisoning, causing loss of consciousness and vomiting. During her stay epileptic attacks, aggressive behavior towards the personnel, and mental debility were observed in the patient who admitted inhaling "tri" because she liked the light-headed feeling it produced. The author attributes her addiction to an illness which occurred early in the patient's childhood, namely inflammation of the brain and meningitis. This led to atrophy of the left cerebral hemisphere resulting in the malfunctioning of the right side of the body, along with paresis of the right hemisphere resulting in epilepsy and convulsive seizures. The author feels that abnormal mental development is undoubtedly a fundamental condition in the patient's addiction. Results of neurological, EEG and radiological tests performed on the patient, along with illustrations are given.

5. Alex, T.

DENVER JUVENILE COURT GLUE-SNIFFING PROJECT.

In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 96-103 (0 ref.), 1967.
 E - intentional - report - solvents - humans - child. - adoles. - male - intent. inhal. - reg. use - peers - low. class - rural - juven. - couns. - probat., rehab. B-1946.

The author discusses the attempts to solve the glue sniffing problem in Denver and the techniques used in studying the problem. Standard group therapy techniques were used and the peer group approach seemed to be the most effective. Improved school work and attendance were achieved. Boys in one group which used an average of 6 tubes of glue were on probation. Use of glue had a high status in their group and a high incidence of trouble with police, poor scholastic and discipline records were also characteristic. A second group from the same neighbourhood were studied and these boys were under-achievers scholastically, but had no police records. In contrast to the first group, these boys admitted their habit reluctantly, as it was taboo and of low status in their group. Case work included work with individuals, family and school. The most effective elements of the treatment seemed to be: the availability of counsellors 24 hours a day, full time group workers, special teachers, and attempted co-ordination of positive forces in the home and school. Emphasis was placed more on changing attitudes and building self-confidence than on directly "stamping out" glue sniffing. It was concluded that glue sniffing is a socio-economic rather than a racial or ethnic phenomenon. It provides the very young with an escape mechanism comparable to adult indulgence in alcohol, drugs, and sex.

6. Allen, S. M.
 GLUE-SNIFFING.
 International Journal of the Addictions (New York), 1(1): 147-149
 (17 ref.), 1966.
 E - intentional - gen. - gen. disc. - solvents - humans - child. -
 adoles. - male - desc. admin. - passiv. - depend. - exhil. - euph.
 - hallu. - impair. - urban - legis. - ataxia B-1947.

Glue sniffing is most prevalent among male youth engaging in pas-
 sive retreatist behavior. Inhalation produces feelings of exhilara-
 tion and euphoria to the extent that the user's outward behavior re-
 sembles that of a person who has consumed alcohol. He may have
 hallucinations, slurred speech, and double vision, and unconscious-
 ness may follow. Some tolerance to the effects may develop. Var-
 ious methods of control have been tried, but there are no federal
 laws regulating manufacture, sale or use. There seems to be no
 physical dependence although psychological dependence may devel-
 op. No institutional therapy program exists for the treatment of
 this behavior.

7. Allison, G. E.
 BIZARRE ADDICTIONS IN CHILDREN.
 Manitoba Medical Review (Winnipeg), 47: 288-290 (9 ref.), 1967.
 E - intentional - gen. - case hist. - gen. disc. - recom. - review
 - gas. - solvents - humans - child. - adoles. - female - male - in-
 tent. inhal. - reg. use - anx. - depress. - depend. - euph. - hal-
 lu. - cult. depriv. - deviant behav. - peers - low. class - hosp. -
 EEG - psych. test - CNS - kid. , liv. - resp. syst. - headache -
 nausea - vomit. B-0714.

Irreversible toxic damage to the CNS, lungs, liver and kidneys, af-
 ter prolonged exposure to aromatic hydrocarbons, is reported.
 References are provided to 19 case histories of accidental and de-
 liberate self-intoxication of children and adolescents by gasoline,
 glue, acetone, and other inhalants. Inadequate fathers, martyr
 mothers and unsettled homes were common features. Pica (a
 craving to eat bizarre materials) has been noted in orally deprived
 children, associated with maternal deprivation. Most reported
 treatments are unsuccessful. Whether volatile hydrocarbons in-
 duce only psychological dependency, or also physical symptoms
 on withdrawal, which class them as addictive drugs, is in dispute.
 The case history of a 13 year old compulsive gasoline fume sniffer
 is presented in considerable detail. He had auditory hallucinations,
 patchy amnesia, was subject to severe tension, and was emotion-
 ally disturbed. He intended to resume inhaling on leaving the hos-
 pital. This lead to the author's plea for improved public health

legislation, to include provision of facilities for adequate treatment despite parental objections. Two characteristics of children who become sniffers are: 1) a heightened or distorted exploratory urge and 2) vulnerability to peer group enticement.

8. Amaldi, P.

ETERISMO E CRIMINALITA. [Ether addiction and criminality].
Archivio di Antropologia Criminale, Psichiatria, Medicina Legale
e Scienze Affini (Turin), 41: 185-199 (0 ref.), 1921.
I - intentional - gen. - case hist. - anesth. - humans - adults -
male - intent. inhal. - reg. use - anx. - depend. - euph. - hallu. -
impair. - trans. prob. - brok. home - deviant behav. - police -
hosp. A-1558.

A 31 year old officer habitually abused ether for a period of 10 years. Within a few months of being introduced to ether, he was consuming as much as 100 gm. per day. He pursued the practice mainly in the evening and in solitude, since any external noise tended to disturb him terribly and transform his fantasies into dreadful impressions. When intoxicated, he was given to leaping out of bed and acting in an irrational manner. In one such state, which observers described as somnambulistic, he was narrowly prevented by his companions from jumping out the window. He suffered various gastric and intestinal disorders, loss of appetite and fatigue; psychologically, he was given to states of perplexity, memory impairment, and depersonalization. On two occasions he was arrested - once, when he was charged with committing obscene acts in public, and at a later date for attempted extortion. Following a short and unsuccessful clinical treatment, he resumed sniffing high doses of ether, which resulted in more serious physical disturbances and insomnia. Eventually, yielding to the urgings of his parents, he attempted to cure himself of his habit by consulting a self-styled hypnotist, whose method consisted of suggestions made with the client being "in a state of semi-hypnosis". Over a period of several months he was able to reduce rapidly and substantially the amount he inhaled, then finally to abandon the habit altogether, with only a short relapse during the time. A general discussion of some narcotics and alcohol, and their chronic abuse and psychological effects is included in the remainder of the paper.

9. Anonymous

ADDICTION TO PETROL VAPOUR

Lancet (London), 1(7335): 707 (1 ref.),

1964.

E - intentional - anon. - case hist. - gas. - humans - adoles. - male - intent. inhal. - pers. prob. - brok. home - kid., liver. - death
A-1583.

A case of a 14 year old boy who sniffed gasoline vapour whenever he felt depressed is described. The inhalation continued for five months until the boy collapsed unconscious after a session of inhaling the vapour. He was discovered six weeks later inhaling the fumes from a motor-cycle fuel tank. Past history revealed that the boy was insecure and had a young step-mother. Reports have indicated that the toxic vapour from gasoline can cause death, and the postmortem findings of its victims are likely to be degenerative changes in the liver and kidneys.

10. Anonymous

ADDICTION TO TRICHLORETHYLENE.

British Medical Journal (London), 2: 1534 (0 ref.), 1949.
E - intentional - anon. - gen. disc. - solvents - humans - adults - male - intent. inhal. - reg. use - impair. - courts A-1561.

A short account of a court case is given involving the charge of manslaughter, while under the influence of trichlorethylene. A 26 year old man was sentenced to 5 years in prison after being found guilty of manslaughter after killing his mother while under the influence of trichlorethylene. The man was employed at a power station and having access to the solvent, he had got into the habit of soaking his handkerchief in it and inhaling the fumes. He became addicted to the substance and one night, upon returning home from a night shift, he attacked his mother to whom he was normally devoted and she died in a hospital of a fractured skull. The defense in his case stated that professional evidence was available to prove that the defendant was at the time of attack in a state of frenzied, uncontrolled delirium, similar to that seen occasionally in people recovering from anesthesia.

11. Anonymous

ANAESTHETIST CHARGED WITH MANSLAUGHTER; INHALATION OF ANAESTHETIC ALLEGED. ANAESTHETIST COMMITTED FOR TRIAL. ANAESTHETIST GUILTY OF MANSLAUGHTER: DRUG ADDICTION ADMITTED.

British Medical Journal (London), 1: 308-309, 376, 591 (0 ref.), 1959.
E - intentional - anon. - report - anesth. - humans - adults - male - intent. inhal. - reg. use - impair. - courts B-1563.

A report is presented of a trial in London England of an anesthetist charged with the manslaughter of a 2 year old boy who died after an operation for a hernia. Death was due to brain damage suffered from anoxia during the operation. The anesthetist inhaled the anesthetic (nitrous oxide, halothane and oxygen) both before and during the operation resulting in the neglect and the failure to control the oxygen supply to the patient. The doctor pleaded guilty and admitted to being an addict to the inhalation of anesthetics for seven years. Sentence was one year imprisonment.

12. Anonymous

ANESTHETIST JAILED.

Journal of the American Medical Association (Chicago), 169(16):

1949 (0 ref.), 1959.

E - intentional - anon. - report - anesth. - humans - adults - male
- intent. inhal. - reg. use - impair. - courts A-1564.

An outline of a report is presented of the trial of a London anesthetist in connection with the death of a 2 year old boy after an herniorrhaphy. Death was due to brain damage from anoxia during the operation. The anesthetist was found to be inhaling anesthetic (a mixture of nitrous oxide, fluothane, and oxygen) during the operation. At the trial, the anesthetist admitted that he had been addicted to inhaling volatile anesthetics for the past 7 years.

(The original report appeared in British Medical Journal, 1: 308-309, 376, 591, 1959)

13. Anonymous

CHANGES PROPOSED TO CURB GLUE-SNIFFING FAD.

Hawaii Health Messenger (Honolulu), 24(1): 1 (0 ref.), 1963.

E - intentional - edit. - solvents - humans - adoles. - depend. -
impair. - legis. - bone mar. - brain - kid. , liv. - resp. syst.

A-1612.

This news item reports the restricting of glue sales making sniffing an offence, and the changing of the poison regulations to thwart the fad which is on the increase. Deaths of four Los Angeles lads are mentioned as well as the possibility of damage to kidneys, lungs, liver, bone marrow, and the brain. Primarily, progression to alcoholism or drug addiction is feared.

14. Anonymous
CHILDREN'S BUREAU EXPRESSES CONCERN ABOUT INCREASE
IN GLUE SNIFFING.
Federal Probation (Washington, D. C.), 27(4): 79 (0 ref.), 1963.
E - intentional - anon. - report - solvents - humans - child. - ado-
les. - intent. inhal. - impair. - bone mar. - kid. , liv. - nerv. syst.
A-1576.
Glue sniffing first came to the attention of the U. S. Children's
Bureau in 1959, and was considered at the White House Conference
on Narcotic and Drug Abuse in 1962 as a hazardous teenage fad re-
quiring community education. The Bureau is concerned over the
incidence and the effects of glue sniffing, which vary from a mild
"jag" to drowsiness, stupor or unconsciousness. The liver, kid-
neys, bone marrow and the nervous system can be affected by the
inhalation of volatile solvents. A nontoxic substitute solvent for
glues is sought.
15. Anonymous
CONFERENCE HELD ON GLUE SNIFFING.
California's Health (Sacramento), 4: 160 (0 ref.), 1963.
E - intentional - anon. - report - recom. - solvents - humans -
legis. A-1577.
A short report is made on a conference held by the California State
Department of Public Health on glue sniffing. The conference was
conducted in order to work out methods with the manufacturers of
glues and with the hobby industry to curb the practice of sniffing
glue for the purpose of intoxication. It was reported that an inten-
sive educational campaign was under way to inform the manufac-
turers, the industry, and the public about the problem, as well as
new non-intoxicating solvents which were being sought for sub-
stitution in glue formulas. It was felt by the majority of persons
present at the conference that local ordinances prohibiting the snif-
fing of glue or other intoxicating materials would be able to cope
with the problem. The consensus of the representatives from in-
dustry, law enforcement, public health and probation departments
was that any proposed legislation should be directed against the
sniffer and not the product. Only 2 of the 30 representatives were
opposed to urging for a law to restrict the sale and regulate the
composition of glue.
16. Anonymous
DANGERS OF GLUE SNIFFING DOCUMENTED BY NEUROLO-
GISTS.
Medical World News (New York), 7(12): 28 (0 ref.), 1966.

E - intentional - anon. - report - case hist. - solvents - humans - adults - male - intent. inhal. - reg. use - euph. - brain - CNS - nerv. syst. - tremors B-1949.

Inhalation of a principal constituent of glue, namely toluene, can cause permanent neurophysiological damage. A 33 year old man who had been sniffing toluene several times a day and using about one gallon a month showed visual disturbances, muscular incoordination, as well as other central nervous system effects. This schizophrenic patient had no appreciation of the seriousness of the situation. His pneumoencephalogram revealed marked loss of brain substance. Neurologists warn that the easy availability and low price of toluene greatly enhance the danger of this psychotropic agent.

17. Anonymous

DEATH FROM CHLOROFORM.

Medical Times and Gazette (London), 23: 625-626 (0 ref.), 1861.

E - intentional - anon. - gen. disc. - anesth. - humans - adoles. - male - desc. admin. - intent. inhal. - reg. use - death A-1560.

A report is presented of a coroner's inquest, concerning the death of a 19 year old medical student from chloroform inhalation. The student was employed at a dispensary where he was known to be in the habit of inhaling chloroform because of the pleasant sensations this induced. On the day of his death he behaved cheerfully, as always, locked himself in his room, as was his custom, and was found later in the day dead with a handkerchief saturated in chloroform fastened over his mouth and nose by means of a cap and rubber band. Beside him was a bottle of chloroform which he took from the dispensary with about 4 drachms of the substance missing. The postmortem examination revealed extreme rigidity but there was no evidence of disease to account for the death. Although his emotional and financial situation did not warrant the possibility of suicide, the cause of death was determined as an overdose of chloroform with insufficient evidence to prove whether suicide was intended.

18. Anonymous

ETHER SNIFFING.

British Medical Journal (London), 1(5324): 198 (0 ref.), 1963.

E - intentional - anon. - report - anesth. - humans - adults - female - male - male - intent. inhal. - reg. use - courts - death A-1578.

A short report of an inquest is cited concerning the accidental death of a woman, probably from ether inhalation. The woman and her husband, 24 and 27 years old, respectively, were both addicted to the inhalation of ether vapour, being accustomed to taking as much as a pint each day. They obtained ether from a chemist's shop under the fictitious excuse of experimenting with ether powered engines. The death occurred during a night when each of them took a pint bottle of methylated ether to bed with them after returning home slightly intoxicated following a night out. The husband lost consciousness after taking about one sniff of ether and found his wife dead the next morning. No further explanation as to the cause of death is given.

19. Anonymous
FACTS ABOUT SOLVENTS.
Addiction Research Foundation Pamphlet (Toronto), 4 pp. (2 ref.),
1969.
E - intentional - anon. - report - solvents - humans - child. -
adoles. - female - male - desc. admin. - chem. - toler. - de-
press. - pers. prob. - depend. - disorient. - exhil. - euph. -
hallu. - impair. - brok. home - deviant behav. - peers - low.
class - ataxia - dizz. B-1953.

Solvents which are abused include cements, nail-polish remover, lighter fluid, cleaning fluids, anesthetics and gasoline. Fumes are inhaled from a bag or cloth containing the solvent. Effects range from mild intoxication to exhilaration. Hallucinations, perceptual alterations, and disorientation occur and, as the concentration in the brain cells increases, the sniffer becomes drowsy and finally unconscious. Tolerance and dependence are shown to solvents, and sniffing may lead to aggressive behaviour. Solvents are usually abused by children, ranging in age from 8 to 16 years, of poor socio-economic backgrounds, and broken homes. One survey showed that 7.4% of the boys in Toronto schools have sniffed glue as compared with 4.2% of the girls.

20. Anonymous
GASOLINE INTOXICATION.
British Medical Journal (London), 1: 1477 (8 ref.), 1961.
E - intentional - anon. - gen. disc. - gas. - humans - adoles. -
intent. inhal. - chem. - cardiovas. syst. - CNS - nerv. syst. -
resp. syst. A-1567.

In answer to a question concerning a 19 year old patient who sniffed

gasoline, a list of chemicals which are contained in different gasolines is given. Inhalation of gasoline fumes may have a neurotoxic effect and result in death due to respiratory failure. Myocardial abnormality can occur due to a direct toxic effect on the heart. Addiction may be similar to inhalation of nitrous oxide, chloroform, or ether. The potential toxicity depends on the concentration.

21. Anonymous

GASOLINE SNIFFING.

Journal of the American Medical Association (Chicago), 173(11):
1276 (0 ref.), 1960.

E - intentional - edit. - gen. - gas. - humans - adoles. - male -
intent. inhal. - reg. use - disorient. - impair. - ataxia - death -
headache - nausea A-1565.

An answer to a query about the physiological effects of addiction of a 17 year old boy to the inhalation of gasoline fumes since childhood notes that persons vary in their susceptibility to petroleum vapors not containing other poisons. 1 - 2 percent gasoline vapor makes most men dizzy in 3 - 5 minutes and endangers life if exposure is continued for 1 hour. Low concentration causes disorientation and other symptoms of a "jag". Chronic exposure may cause nausea, loss of appetite and weight; neurasthenic symptoms, muscular weakness and cramps. Loss of memory, analgesia, paresthesias, myalgia, polyneuritis and anemia may develop.

22. Anonymous

GAS-SNIFFING WARNING.

American Medical Association News (Chicago), 10(43): 1 (0 ref.),
1967.

E - intentional - anon. - report - solvents - humans - intent. in-
hal. - death B-1950.

The duPont Company reports the deaths of 7 persons from sniffing Freon for intoxication. They warn that this and other gases, under different trade names, sold in aerosol cans and used for chilling cocktail glasses, are potentially dangerous.

23. Anonymous

GLUE SNIFFING.

British Medical Journal (London), 2(5311): 1043 (0 ref.), 1962.

E - intentional - anon. - gen. disc. - solvents - humans - child. -
adoles. - desc. admin. - intent. inhal. - toler. - depend. - dis-
orient. - exhil. - euph. - impair. - low. class - juven. A-1571.

In 1961, 134 children were arrested in Denver for glue sniffing. Usually, cement is squeezed into a rag and inhaled, but a more rapid effect is obtained if the glue is vaporized by heat. Euphoria and exhilaration lead to disorientation and coma. Tolerance and psychological dependence may develop. Most of the arrested Denver adolescents were of low socio-economic status and were emotionally disturbed. There is a danger that sniffing may lead to alcoholism and other forms of drug addiction. Measures have been taken to restrict the sale of glue and to add bad smelling substances to the glue.

24. Anonymous
GLUE-SNIFFING.
Journal of the American Medical Association (Chicago), 181(4):
333 (0 ref.), 1962.
E - intentional - edit. - gen. disc. - solvents - humans - adoles. -
intent. inhal. - reg. use - disorient. - exhil. - euph. - impair. -
juven. A-1570.

Editorial comments are made on a study of the physical and psychological effects of glue sniffing, as well as on a study on the association of glue sniffing with delinquency. It is said that deliberate inhalation of vapors of plastic cements and airplane glues is being used by adolescents and older children to produce euphoria and exhilaration. Continual inhalation may lead to intoxication, disorientation, and even coma. Similar effects were reported to have been observed with paint thinners, lacquers, enamels, and marking pencils. The active agent is thought to be the organic solvent used in these products. Besides immediate psychologic aberrations due to sniffing the vapors of such products, there also exists the possibility of damage being caused to various organ systems. In reference to a reported study, the seriousness of delinquency associated with glue sniffing is emphasized, concluding that the problem can be identified and solved only through the cooperation of juvenile and medical authorities.

25. Anonymous
GLUE-SNIFFING. AN ADOLESCENT CRAZE THAT IS NOT
AMUSING.
Consumer Reports (New York), 28(1): 40 (0 ref.), 1963.
E - intentional - anon. - gen. disc. - recom. - solvents - humans -
adoles. - toler. - exhil. - euph. - impair. - detect. - bone mar. -
cardiovasc. syst. - kid., liv. - nerv. syst. - resp. syst. - ataxia
- death - tinnitus - urin. path. A-1579.

Adolescents have learned that they can obtain an effect outwardly resembling alcohol intoxication by inhaling glue fumes. The first reaction is one of mild intoxication, euphoria, and excitement. Later, the sniffer acts drunk, sees double, and feels drowsy. Unconsciousness may follow. Accidental intake or inhalation of high concentrations of solvents have produced irritation of the mucous membranes, excitation, and depression of the central nervous system, cellular injury of the heart, liver, and kidneys, as well as other pathological effects. Parents are urged to take their children to a doctor for an examination if they suspect inhalation, and merchants are asked to notify the police if there is a sudden increase in sales of airplane glue.

26. Anonymous

GLUE SNIFFING - A PROBLEM IN KANSAS?

Newsletter (State Board of Health, Kansas), 30: 4-5 (0 ref.), 1963.
 E - intentional - anon. - gen. disc. - solvents - humans - child. -
 adoles. - male - desc. admin. - intent. inhal. - occas. use - reg.
 use - euph. - hallu. - impair. - deviant. behav. - detect. - urin.
 test - brain - cardiovasc. syst. - CNS - kid., liv. - anemia - dizz.
 - urin. path. A-1581.

Effects of glue sniffing resemble alcohol intoxication. Dizziness, euphoria, hallucinations, dreams, and sensations of "floating away" are common. Offenders often went on to use marijuana, barbiturates, and narcotic drugs. Damage to the brain, neurological system, and kidneys is shown. Sniffers empty tubes of glue into a handkerchief, gauze or plastic bag and the warmth of the body causes the fumes to rise. Although the taking of solvents is habit forming there are no addictive properties. Fumes damage mucous membranes of the mouth, nose, and eyes, and sores may result. Parents should acquaint themselves with the dangers of glue sniffing.

27. Anonymous

GLUE SNIFFING BECOMES FLORIDA PROBLEM.

Florida's Children (Tallahassee), 13(3): 2 (0 ref.), 1962.
 E - intentional - edit. - gen. disc. - solvents - humans - adoles. -
 intent. inhal. - euph. - impair. - deviant behav. - juven. A-1572.

The problem of solvent sniffing is described briefly, mentioning its effects, reasons for initiating it, and problems with its prevention. Glue sniffing is reported to have become a common practice among youngsters for the purpose of bringing about inebriation. Sniffing of other substances such as lighter fluid, cleaning solutions, paint thinners, and gasoline is also said to cause sensations of drunken-

ness and euphoria, accompanied with feelings of recklessness, often leading to violent and impulsive acts. The motivation behind this form of abuse seems to range from antisocial behavior (rebellion) to escape from reality. For more hardened delinquents, solvent sniffing is a handy substitute for alcohol or more expensive narcotics. Prevention of this abuse could be exercised through control of sales; however, this presents a tremendous difficulty due to the wide variety of inebriation-producing solvents available.

28. Anonymous
 GLUE SNIFFING BY YOUNGSTERS FOUGHT BY DEPARTMENT.
 New England Journal of Medicine (Boston), 267(19): 993-994
 (0 ref.), 1962.
 E - intentional - edit. - gen. disc. - recom. - solvents - humans -
 exhil. - impair. - detect. - ataxia - death - tinnitus A-1573.

A boy's death after glue sniffing prompted a campaign by the Massachusetts Department of Public Health to stamp out the teenage fad. This note summarizes recommendations. Storekeepers should advise use in well ventilated rooms and report excessive sales. Signs of intoxication include irritability, acting drunk, or loss of consciousness. These should alert parents and teachers to the need for referral of the child to the doctor to prevent irreparable damage or psychologic dependency.

29. Anonymous
 GLUE-SNIFFING FAD BECOMES MORE POPULAR WITH
 SCHOOL-AGE CHILDREN.
 Safety Education (New York), 40(3): 26 (0 ref.), 1963.
 E - intentional - anon. - gen. disc. - recom. - solvents - humans
 - adoles. - male - reg. use - impair. - deviant behav. A-1580.

The teenage fad of glue sniffing has grown to such proportions that it is hampering the educational process. A 14 year old boy, accustomed to inhaling 5 tubes of glue per day attacked a woman, took her car, and smashed into three other automobiles. It has been suggested that hobby glues should be labelled as poisons and sold in pharmacies. One manufacturer is trying to find a method of using less of the solvents which produce the intoxicating effect, but their absence would slow down the drying effect. Other companies are considering using solvents that give off unpleasant odours, but they fear that the legitimate hobbyists would not buy them. Antisniffing laws and the limiting of sales of two tubes to a customer are methods currently employed to control the problem.

30. Anonymous
GLUE SNIFFING IN CONSUMER REPORT.
New Jersey Welfare Council Bulletin (Newark), 34(7): 3 (0 ref.),
1963.
E - intentional - abst. - anon. - solvents - humans - adoles. -
toler. - depend. - exhil. - euph. - impair. - deviant behav.

A-1582.

A short report is given on glue sniffing, describing the effects of the inhalation of the concentrated plastic cements or airplane glues which include mild intoxication, exhilaration, and euphoria. The symptoms closely resemble those of alcohol intoxication, namely uncoordination, slurring speech, buzzing in the ears followed by drowsiness, stupor or unconsciousness. Usually with continuous use, a physical tolerance builds up, and the sniffer may require as much as 5 times the amount to obtain the same effects. Although the degree of addictiveness of glue fumes has not yet been established, dependence does occur resulting in moral deterioration. Physical symptoms include excessive amounts of mucous secretion from the membranes of the nose or throat. Parents are advised to take their children to a doctor if the suspicion of glue sniffing arises and storekeepers are asked to notify the police if there is a sudden increase in the sale of model airplane glue. Teachers are alerted to the symptoms of glue sniffing in the classroom.

31. Anonymous
GLUE-SNIFFING KIDS GO ON JAGS.
Hazards Control Information Exchange Bulletin (Berkeley), 1(5):
2-3 (0 ref.),
1961.
E - intentional - edit. - gen. disc. - solvents - humans - child. -
adoles. - male - exhil. - impair. - peers - juven. - CNS - resp.
syst. - dizz. - headache
A-1568.

The arrest of 7 boys after confessing to stealing tubes of model airplane glue for the purpose of sniffing is reported. The report includes statements of a health officer and the editor regarding the harmful effects of sniffing airplane glue vapors, as well as its symptoms which can help to spot children sniffing glue. The boys in the report, 10 - 13 years of age, stole 30 tubes of airplane glue in 3 weeks and have been sniffing their contents on school grounds, as well as outside school, to achieve intoxication. Sniffing the contents of the tubes, containing chiefly acetone as a solvent, acts depressively on the CNS, and can cause bronchitis and tracheitis. The narcotic effects of acetone are somewhat greater than those of alcohol and continued inhalation of acetone can bring about excitement, headache, fatigue, and finally unconsciousness and nar-

cosis. The fat-solvent action of acetone causes skin irritation and secondary infectious resulting in a characteristic reddening of the face, which when coupled with peculiar behavior, can serve for easy spotting of glue sniffing children.

32. Anonymous

GLUE SNIFFING PROBLEMS CONTINUE TO AROUSE INTEREST - USPHS ASKS FOR REPORTS ON INCIDENTS.

Hazards Control Information Exchange Bulletin (Berkeley), 2(5): 2-4 (0 ref.), 1962.
E - intentional - edit. - gen. disc. - solvents - humans - adoles. - intent. inhal. - reg. use - toler. - euph. - hallu. - impair. - deviant behav. - peers - hosp. - dizz. - tinnitus A-1574.

The U. S. Public Health Service's (USPHS) interviews of 12 boys aged 14 - 18 years, reveal that glue sniffing is almost universal amongst the boys (not girls), producing euphoria, hallucinations, and destructive behavior. Tolerance sometimes develops. A few had inhaled gasoline fumes, ether, or marijuana. Waverers were influenced by their peers to continue. All claimed that they could stop, but would seek a substitute with similar effects. No evidence of neurological impairment or intellectual dulling was detected except in one excessive sniffer who was irrational for 2 - 3 weeks, hospitalized, and cured. Evaluation of medical data related to specific fumes was complicated by former inhalation of other substances and also inaccurate reporting of frequency of intake. Conflicting reports by authorities regarding hazards nullify the incentive to stop sniffing. More data is being accumulated by the Poison Control Centre, Washington. Chemicals in plastic cements, cleaning and lighter fluids were listed.

33. Anonymous

'GLUE SNIFFING' SOLUTION SEEN IN NEW CHEMICAL.

Science News Letter (Washington, D. C.), 85: 344 (0 ref.), 1964.
E - intentional - edit. - gen. disc. - solvents - humans - child. - adoles. - male - toler. - exhil. - impair. - deviant behav. - legis. - kid., liv. - resp. syst. - ataxia - death - tinnitus A-1584.

The physical and psychological effects of glue sniffing are briefly described and illustrated by actual examples in a note commenting on a new solvent which may replace the intoxicants used in airplane glues. It is said that prolonged sniffing can burn out nose membranes and cause damage to the liver, kidneys, and the respiratory organs. The psychological effects are much more common. These include personality changes similar to those of adult alcoholics, im-

paired judgement, and even belligerence. Cases are cited of a 15 year old boy whose death was precipitated by impaired judgement while under the influence of glue fumes, and 2 cases of homicidal threats and attacks by young boys who had sniffed airplane glue. The effects of sniffing are said to range from mild intoxication, exhilaration, excitement, slurred speech, buzzing in ears, double vision leading to drowsiness, and unconsciousness. Tolerance usually develops with a need to increase the dosage, sometimes as much as five fold.

34. Anonymous

IT HAS COME TO OUR ATTENTION.

Federal Probation (Washington, D. C.), 26: 78 (0 ref.), 1962.
E - intentional - edit. - gen. disc. - solvents - humans - adoles. -
impair. A-1575.

In a communication, a short reference is made to a study of the growing practice of glue-sniffing, listing some of its general effects. It is said that glue sniffing is becoming a serious threat among teenagers who practice it in order to achieve intoxication to coma. It is suggested that immediate action should be taken in order to eliminate the problem. The acuteness of this problem is apparent from a report by the U. S. Public Health Service which indicates that glue sniffing has become a nationwide problem.

35. Anonymous

JUDGE SAYS GLUE CAUSED KILLINGS.

Juvenile Court Judges Journal (Chicago), 18(2): 49 (0 ref.), 1967.
E - intentional - edit. - report - solvents - humans - adoles. -
male - impair. - deviant behav. - courts B-1951.

A 15 year old boy was arrested after killing an 8 year old girl and her 6 year old sister. A Juvenile Court judge acquitted the boy on the grounds that glue sniffing had made him temporarily insane and that he was incapable of controlling his actions at the time of the killings. The boy was committed to a mental hospital.

36. Anonymous

PLASTIC CEMENT FUMES.

Journal of the American Medical Association (Chicago), 173(11):
1277 (0 ref.), 1960.
E - intentional - anon. - gen. disc. - solvents - humans - adoles. -
intent. inhal. - exhil. - hallu. - impair. - cardiovasc. syst. - kid.,
liv. - resp. syst. A-1566.

An answer to a question about the toxicity of plastic cement fumes, referring to a teenage boy addicted to inhaling the fumes notes that the toxicity depends on the concentration and the composition of the vapors. Some contain chlorinated hydrocarbons which are liver poisons and may damage the respiratory and circulatory systems if used often in concentrations sufficient to produce a "jag". Solvents are primarily narcotic agents and induce pleasant hallucinations. Effects first noted in industry (of exhilaration and intoxication) are now sought by imaginative teenagers.

37. Anonymous

SNIFFING SYNDROME.

British Medical Journal (London), 2(5755): 183 (10 ref.), 1971.
 E - intentional - edit. - gen. disc. - gas. - solvents - humans -
 child. - adoles. - impair. - brain - cardiovasc. syst. - kid., liv.
 - anemia - card. arrhy. - death - urin. path. B-1954.

Reports on the pathological effects of various glues, solvents, and other products sniffed increasingly since the 1950s are cited. Glue sniffing, rarely reported in Great Britain, has been the most popular sniffing syndrome in America. Pathological effects of glue or toluene sniffing include cerebral damage, aplastic anemia, acute hepatic and renal damage, and death due to asphyxiation. Inhalation of petrol fumes has been reported to cause hepatic damage and lead to encephalopathy, and trichloroethylene in spot removers leads to acute renal and hepatic necrosis. Fluorinated hydrocarbons in aerosols are possibly the most dangerous, and have caused sudden deaths. A cardiotoxic effect with perhaps sensitization of the heart to endogenous catecholamines is suspected. Diagnosis of sniffing syndrome may be difficult, but may be evident in breath odour, or with the aid of laboratory tests on blood, breath and urine. It should be considered in any unexplained illness in teenagers.

38. Anonymous

SUICIDE AND INTOXICATION BY CHLOROFORM.

Medical Times and Gazette (London), 15: 533-534 (3 ref.), 1857.
 E - intentional - edit. - case hist. - anesth. - humans - adults -
 male - reg. use - depress. - depend. - hosp. - death A-1559.

The article consists of three case histories selected from contemporary French medical journals all concerning the effects of chloroform. The first describes a man who committed suicide by drinking in 37 1/2 drachms of chloroform. The second case history describes a chemist who was habituated to morphia, then became ad-

dicted to chloroform, supposedly by inhaling 1 pound of it every 5 or 6 days. As a result of an accident, double amputation of his legs was necessary. In spite of his addiction, it was still possible to anesthetize him with chloroform although morphia was ineffective in relieving pain. The third case was a man who inhaled chloroform to relieve asthma. As tolerance developed the dose was increased to approximately 40 drachms each day. Two episodes of jaundice resulted in hospitalization and recovery from the chloroform addiction.

39. Anonymous

THE LATEST ON DRUGS.

Addiction Research Foundation (Toronto), Unpublished Paper, 5pp.
(0 ref.), 1968.

E - intentional - anon. - gen. disc. - solvents - humans - child. -
adoles. - chron. dos. - hallu. - impair. - deviant behav. - low.
class - urban - cardiovasc. syst. - CNS - kid., liv. - nerv. syst.
- headache - nausea - tinnitus B-1952.

No adequate epidemiological study of glue sniffing has been reported, but preliminary reports have indicated that the practice is adopted by younger teenagers of lower socio-economic groups in urban populations. Solvents have demonstrated an affinity for nerve tissue and this results in stupor, narcosis, and coma. Elimination of inhalation usually restores full function but prolonged intake may result in permanent injury to the central nervous system. The glue sniffer may experience double vision, headache, nausea, or hallucinations.

40. Anonymous

TRICHLORETHYLENE ADDICT.

British Medical Journal (London), 1: 1550 (0 ref.), 1961.

E - intentional - edit. - report - solvents - humans - adults - male
- intent. inhal. - reg. use - courts - death A-1569.

A man aged 30, died from inhaling trichlorethylene vapor from a tank in a degreasing plant. He had become increasingly addicted until about 6 months before his death when he began to lose his self control. The employers were found negligent and an award was made to his widow. The prosecution said that the employers should have known that continued exposure could cause addiction. The defence claimed that the victim caused, or contributed to his death by deliberate inhalation of, and even drinking, the solvent.

41. Anonymous
 TRICHLORETHYLENE ADDICTION.
 Lancet (London), 2: 1205 (1 ref.), 1949.
 E - intentional - edit. - gen. disc. - solvents - humans - adults -
 male - intent. inhal. - reg. use - impair. - courts A-1562.

A 26 year old man was introduced to the fumes of trichlorethylene at work at a power station. It was used for processing machinery and cleaning hands. He became addicted and soaked his handkerchief in it regularly to sniff. Homicide resulted when he attacked his mother without intent. As trichlorethylene can induce delirium with complete loss of control, he was sentenced to 5 years for manslaughter and not for murder.

42. Archibald, H. D.
 GLUE SNIFFING IN METROPOLITAN TORONTO. STATEMENT
 FROM THE ALCOHOLISM AND DRUG ADDICTION RESEARCH
 FOUNDATION.
 Addiction Research Foundation (Toronto), Unpublished Paper, 6pp.
 (0 ref.), 1968.
 E - intentional - report - recom. - solvents - humans - legis.
 B-1955.

The glue manufacturers have found no way of making glue without the use of toluene. Research to find an obnoxious odoured substance to be included in glue has not been successful. It is the opinion of the author that laws regulating the marketing process of glues have limitations but that their value would lie in that they would reduce the total public exposure to the opportunities to abuse these products. Legislation against the inhalation of solvents would make criminals out of many juveniles and the author feels that the problem should be approached from a health perspective. Education, treatment, and research are indicated as possible answers to the problem of glue sniffing.

43. Baader, E. W.
 TÄTIGKEITSBERICHT DER ABTEILUNG FÜR GEWERBEKRANK-
 HEITEN DES KAISERIN AUGUSTE-VIKTORIA-KRANKENHAUSES
 IN BERLIN-LICHTENBERG. [Progress report from the division
 for industrial illness of the Empress Auguste Victoria Hospital in
 Berlin-Lichtenberg.]
 Zentralblatt für Gewerbehygiene und Unfallverhütung (Berlin), 4(11):
 385-393 (2 ref.), 1927.
 G - intentional - report - case hist. - solvents - humans - adults -

male - intent. inhal. - reg. use - depend. - nerv. syst. - headache
A-1585.

Of the cases treated in the clinic for various kinds of poisoning from industrial solvents, several involved the harmful chronic exposure to vapours of trichloroethylene. One was that of a 43 year old metal washer who had serviced the "tri" machine in a metal works factory for 6 years. He found the solvent's odour to be so pleasant that he developed an addiction to the inhalation of its vapours. As a result, he suffered from headaches, acute loss of weight, and a severe retrobulbar neuritis.

44. Baerg, R. D., and Kimberg, D. V.
CENTRILOBULAR HEPATIC NECROSIS AND ACUTE RENAL FAILURE IN "SOLVENT SNIFFERS".
Annals of Internal Medicine (Philadelphia), 73: 713-720 (35 ref.),
1970.
E - intentional - gen. - case hist. - solvents - humans - adoles. - female - male - intent. inhal. - occas. use - reg. use - pharmacol. - metabolism - toxicol. - pers. prob. - hosp. - biopsy - blood test - EEG - urin. test - kid., liv. - nerv. syst. - headache - nausea - urin. path. - vomit.
B-1948.

Case histories of 3 teenagers who developed acute hepatic injury, attributable to Carbona (trade name) inhalation are presented to illustrate the clinical state of those with acute trichloroethylene (TCE) inhalation poisoning. Two teenagers had acute renal injury, presumable due to tubular necrosis. Hepatic biopsy in 2 showed centrilobular hepatic necrosis. ECG and EEG abnormalities were noted. Carbona currently contains 44% TCE and 56% petroleum distillates; however, the old solutions sniffed by 2 of the patients contained 70% TCE. All patients had a history of drug abuse including: glue sniffing, use of amphetamines, heroin, cocaine, marijuana, barbiturates, phenothiazines and LSD. Liver function tests and other laboratory and biopsy findings are detailed. Two of the patients reported no use of alcohol. All had used Carbona intermittently and were admitted due to the onset of various acute symptoms and later were discharged after treatment chiefly by bed rest. Reports on metabolism of TCE and its toxicity in animals and humans in different types of exposure (chronic industrial, acute massive inhalation, anesthesia, and solvent sniffing) are cited. Renal damage, as in 2 of these cases, is more unusual than hepatic toxicity. The mechanism of action and its relation to CCl_4 toxicity are discussed. Acute onset of symptoms in those with a history of solvent sniffing should help in diagnosing toxic, as opposed to viral hepatitis.

45. Barker, G. H. , and Adams, W. T.
 GLUE SNIFFERS.
 Sociology and Social Research (Los Angeles), 47(3): 298-310
 (0 ref.), 1963.
 E - intentional - gen. - gen. disc. - review - solvents - humans -
 child. - adoles. - male - desc. admin. - intent. inhal. - euph. -
 impair. - brok. home - cult. depriv. - peers - low. class - urban
 - courts - juven. - dizz. - headache - tremors A-1586.

Research was conducted on two groups of boys, glue sniffers and non-glue sniffers, committed to a boys' school as delinquents. It was found that glue sniffing is most likely to occur among ethnic minority young males who are very low achievers. These boys come from broken homes, living in high delinquency areas, and having an average of seven to eight other siblings. Effects of glue inhalation described by the sniffers are: dizziness, severe headaches of short duration, a buzzing sensation in the head, a feeling of drunkenness, euphoria, double vision, and poor concentration. Availability of glue is one incentive for sniffing but the motivation for this practice is complicated. Reasons such as status-seeking in peer groups, social pressures, and family problems are suggested as explanations for the use of glue.

46. Barman, M. L. , Sigel, N. B. , Beedle, D. B. , and Larson, R. K.
 ACUTE AND CHRONIC EFFECTS OF GLUE SNIFFING.
 California Medicine (San Francisco), 100(1): 19-22 (10 ref.), 1964.
 E - intentional - gen. - case hist. - gen. disc. - solvents - humans
 - adoles. - male - desc. admin. - intent. inhal. - toxicol. - impair.
 - deviant behav. - police - blood test - psych. test - urin. test -
 cardiovasc. syst. - CNS - kid. , liv. - nerv. syst. - anemia -
 headache A-1587.

Intoxication by glue vapour resembles acute alcohol intoxication. Components of cements are tabularized and references to their toxicity cited. Due to the serious consequences to the CNS and to different organs reported during industrial use and in animal tests, a study of acute and chronic effects of glue sniffing in 15 boys, ages 13-18, was undertaken. Gross, but transitory deviations in the Bender Visual Motor Gestalt Test were found. Extensive hematological, liver, and renal function tests are tabled. These were normal and attributed to the apparently low concentrations required for intoxication. A case history is described involving suicidal behaviour. Lumbar puncture showed 298 mm. water pressure. Tentative diagnosis of brain tumor was revised when the glue sniffing habit was known. This is a new entity to be considered in diagnosis when there is high fluid pressure. It is probably due to cerebral

edema from absorption of toxic materials. Literature is cited, stating that neuropsychological changes caused by solvent sniffing are reversible. Information about concentrations inhaled is lacking.

47. Bartholomew, A. A.

TWO CASES OF ETHER ADDICTION/HABITUATION.

Medical Journal of Australia (Sydney), 49(14): 550-553 (24 ref.),

1962.

E - intentional - gen. - case hist. - review - anesth. - humans - adults - male - desc. admin. - intent. inhal. - reg. use - depend. - courts - ataxia - tremors A-1588.

The first case concerns a 27 year old man who had been addicted to ether for four years. He was examined as a result of a conviction on a larceny charge. Past history revealed that his father favored the patient's sister while his mother over-protected the patient. The patient won a scholarship to a technical school and later joined the Air Force. He enjoyed his first six months in the Service but became ill and was discharged. He was admitted to mental institutions on five occasions and had an extensive criminal record which included forging prescriptions for ether, stealing ether, and causing bodily harm. The patient found that with ether he could talk to himself and say things about himself that he could not otherwise manage, and he could manipulate his dreams. His technique was as follows: he would lie on a bed and inhale the fumes from a pad soaked in ether. After loss of consciousness, he would sleep for six to eight hours and, upon awakening, would feel elated. The second case, concerning a 31 year old man who drank up to half a pint of ether a day, is only briefly discussed.

48. Bartlett, S. , and Tapia, F.

GLUE AND GASOLINE 'SNIFFING,' THE ADDICTION OF YOUTH.

Missouri Medicine (St. Louis), 63(4): 270-272 (12 ref.), 1966.

E - intentional - gen. - case hist. - gas. - solvents - humans - adoles. - male - accid. inhal. - acute dos. - chron. dos. - toler. - charac. desc. - pers. prob. - hallu. - impair. - cult. depriv. - rural - urban - juven. - EEG - CNS - ataxia - death - dizz. - headache - tinnitus - tremors - weak. B-1956.

A 15 year old delinquent, sniffing gasoline periodically for 4 years, would consistently experience hallucinations after only 15 "deep drags". He seemed insensitive to pain while intoxicated. This particular case history is part of an evaluation of other studies. People develop tolerance and need to increase the doses. CNS ef-

fects and predisposing sociological factors are discussed. Some imbibe for anesthetic effect, and in 1 study, 50% of the subjects reported hallucinations. The gasoline sniffer is apt to be a loner, while the glue sniffers do so in gangs. A ratio of 10 boys/1girl are reported addicted. The EEG appears abnormal only during the acute phase, and prognosis is difficult to determine. Although the habit is almost unknown among adults, sniffers may progress to alcohol or other habituation for "kicks", as most come from chaotic homes and have character defects. Gasoline inhalation is more prevalent in rural areas while glue is prevalent in urban areas, and there are more reports of abuse of glue than of gasoline. Smoking and alcohol are often also involved and alcoholism was a trait in at least one parent in 37% of the families studied in one study. Institutionalization is suggested, both to remove the child from the source and to allow psychotherapy.

49. Baselt, R. C., and Cravey, R. H.
A FATAL CASE INVOLVING TRICHLOROMONOFUOROMETHANE AND DICHLORODIFLUOROMETHANE.
Journal of Forensic Sciences (Mundelein), 13(3): 407-410 (6 ref.),
1968.
E - intentional - gen. - case hist. - solvents - humans - adoles. - male - intent. inhal. - metabolism - toxicol. - autop. - blood test - chromatog. - kid., liv. - resp. syst. - death - vomit. B-1957.

Death of a 15 year old boy after the abuse of the freon propellant in a spray-on coating for frying pans is reported. During autopsy, numerous sites of hemmorrhaging in the lungs and vascular congestion in the liver, spleen, and kidneys were noted. Concentrations of trichloromonofluoromethane and dichlorodifluoromethane in the blood, kidney, brain, lung, liver, and stomach contents are listed. The cause of death was considered to be anoxia. Methods of analyses by gas chromatography are described. The plastic bag used for inhalation was coated with lecithin from the spray, but this was not found to a significant degree in the lungs. A letter from a manufacturer of freons is mentioned, noting several previous deaths but a report on animal studies indicates that the entire contents of the 9 oz. can used could not have been sufficiently toxic to cause death.
50. Bass, M.
SUDDEN SNIFFING DEATH.
Journal of the American Medical Association (Chicago), 212(12):
2075-2079 (19 ref.),
1970.
E - intentional - report - case hist. - solvents - humans - adoles. - adults - female - male - desc. admin. - intent. inhal. - occas.

use - reg. use - mid. upper class - autop. - bone mar. - brain -
 kid., liv. - resp. syst. - card. arrhy. - death B-1882.

The cause of 110 sudden deaths in the United States during the 1960s after sniffing volatile hydrocarbons (usually trichloroethylene or fluorinated hydrocarbons) is analysed. The incidence rate showed a sharp rise (1960 - 67, 30%; 1968 - 69, 70%) towards the end of the decade. The boys and girls, aged 11 to 23 years of age were usually from middle income suburban homes. Severe cardiac arrhythmia resulting from light plane anesthesia, intensified by hypercapnia or stress, was evidently responsible. Autopsy revealed no anatomical cause of death. The textbook explanation of progressive medullary failure is obsolete and no deaths were due to suffocation from plastic bags. Maps relating incidence to location (highest in California) and graphs linking specific chemicals to deaths between 1962 and 1969 are provided. A table listing the activity or stress associated with death includes: heavy exercise, autoerotic activity, cold, or hallucinogenic crisis. Expected systemic toxic effects to the liver, kidneys, brain, and bone marrow, from plastic cements, were found negative in human and animal experiments between 1958 and 1961. However these sudden deaths follow a characteristic pattern with pathophysiology resembling the operating room anesthetic death and is a hazard which should be publicized.

51. Beluze
 DE L'ÉTHÉROMANIE. [On ether addiction].
 Annales d'Hygiène Publique et de Médecine Légale (Paris), s. 3,
 15: 539-557 (15 ref.), 1886-1887.
 F - intentional - gen. - review - anesth. - humans - desc. admin. -
 intent. inhal. - chron. dos. - reg. use - hallu. - impair. - death
 A-1589.

This general discussion on the common use and abuse of ether, past and present, begins with the definition of the terms "etherism" and "ethermania", which the author relates to the terms "alcoholism" and "dipsomania". The discovery of ether and the early experimentation with it, its first application to surgical anesthesia, the literary allusions to it, and the history of its non-medical use are reviewed. Special attention is devoted to ethermania which develops from the legitimate therapeutic use of the substance for the relief of pain, as well as to the widespread custom of ether drinking in Ireland and its corresponding practices in France. Its modes of administration, physical and physiological effects of chronic use are outlined. Examples are given from cases recorded in medical literature, and a summary of the experience during self-

experimentation reported by J. J. Sauvet (Annales Medico-psychologiques (Paris), 10: 467, 1847) is included.

52. Bertucelli, L. , and Schiller, E.
 SU DI UN CASO DI BENZINOMANIA. [On a case of gasoline addiction].
 Rassegna de Studi Psichiatrici (Siena), 51: 298-308 (23 ref.), 1962.
 I - intentional - gen. - case hist. - gas. - humans - adults - male
 - intent. inhal. - chron. dos. - reg. use - anx. - pers. prob. -
 depend. - euph. - hallu. - impair. - brok. home - EEG - psych.
 test A-1590.

The case of a 27 year old man who began periodically inhaling gasoline fumes at the age of 13 is reported in detail. Results of physical and psychological tests, including the EEG and the Rorschach, are given. The psychometric tests demonstrated an alteration of disposition with a tendency to impulsiveness and to emotional disturbance of a destructive type. The patient was also found to be intellectually bordering on the sub-normal, and consequently, his reduced perceptivity of reality found compensation in the fantastic sensations produced by the inhalation experience which was characterized by mainly visual, but also auditory hallucinations, with an oneiric reduction of consciousness of spatial and temporal dimensions. The patient claimed that when he made a point of concentrating on something in the course of inhalation, his hallucinations tended to be rich and scenic, with generally erotic content, resulting in a kind of ecstatic pleasure with frequent sexual orgasms. If there was no deliberate concentration, the hallucination became confused, frightening, and like nightmares. The patient was particularly attracted to this form of intoxication by his ability to control or direct his dream-consciousness, although this ability diminished in the final stage of the experiences.

53. Bethell, M. F.
 TOXIC PSYCHOSIS CAUSED BY INHALATION OF PETROL FUMES.
 British Medical Journal, 2: 276-277 (11 ref.), 1965.
 E - intentional - gen. - case hist. - gas. - humans - adoles. -
 male - intent. inhal. - reg. use - anx. - hallu. - impair. - cult.
 depriv. - kid. , liv. - death - urin. path. B-0034.

References to the only 15 cases of addiction to the inhalation of petrol reported between 1951-1964, are provided. They include two 6 year olds. Some had inhaled for several years, and had vivid hallucinatory, and sometimes frightening, experiences. Death due

to liver and renal necrosis may ensue. Relief of tension is the prime motive for starting. The case of a 14 year old boy, 4th child in an unhappy home, is outlined. The boy was sensitive and tense. He found school life uncongenial, and lessons difficult. One evening, after 4 months of periodically inhaling petrol vapor, he became breathless, hot, flushed, and frightened by hallucinations about foxes. These acutely disturbing symptoms cleared up the same night, but he was given a long acting phenobarbitone capsule daily for a few weeks. He gained more attention at home, appeared happier at school, and apparently gave up the habit.

54. Black, P. D.
MENTAL ILLNESS DUE TO THE VOLUNTARY INHALATION OF
PETROL VAPOUR.
Medical Journal of Australia (Sydney), 2: 70-71 (7 ref.), 1967.
E - intentional - gen. - case hist. - gas. - humans - child. - adoles.
les. - female - male - intent. inhal. - occas. use - anx. - euph. -
hallu. - cult. depriv. - hosp. - psychother. - blood test - EEG -
psych. test - urin. test - ataxia B-1960.

This is a case history of a 15 year old boy in Australia who sniffed vapour from automobile tanks for 2 1/2 years. Most recorded cases have appeared in North America and refer to children and adolescents, usually males. This boy, like many described in the literature, had a very disturbed home, felt insecure, and found that petrol intoxication provided an escape from harsh reality. His initial experience was accidental. Fluctuating moods and peculiar behaviour were noted at home and school. Other children thought he was mad. He had visual hallucinations with auditory components. 15 to 20 breaths induced hallucination and then euphoria for 5 to 6 hours. He was born in Germany and was illegitimate, which he was told. The family emigrated to Australia when he was 5 and there was considerable discord and severe corporal punishment. The pain was relieved by the petrol intoxication. His pupils were almost constantly dilated just prior to hospital admission with schizophrenia-like symptoms. The EEG, cerebrospinal fluid and other biochemical analyses were normal. Some psychometric tests were done. He responded favourably to individual and group therapy with no medication. He was discharged to a hostel, is employed, and has not resumed sniffing.

55. Blatherwick, C. E.
UNDERSTANDING GLUE SNIFFING.
Vancouver City Health Department (Vancouver), Unpublished
Paper, 12pp. (28 ref.), 1971.
E - intentional - report - recom. - review - solvents - humans -

child. - adoles. - female - male - desc. admin. - intent. inhal. - reg. use - toler. - alien. - depend. - euph. - hallu. - impair. - brok. home - deviant behav. - low. class - mid. upper class - juven. - EEG - bone mar. - cardiovasc. syst. - CNS - kid., liv. - resp. syst. - ataxia - card. arrhy. - dizz. - nausea - tinnitus - vomit.

B-1961.

The author presents a report on all aspects of solvent use. In the description of the effects of this behavior, reference is made to euphoria, hallucinations, amnesia, depression, tinnitus, ataxia, and vomiting. The effects are enhanced by ethanol ingestion. Behavioral effects are also discussed. The physiological effects of these chemicals on the liver and kidney, the heart, the blood and bone marrow, and lungs are quite serious and the results of studies are used to present the damaging consequences of the action of solvent sniffing. A large portion of the paper outlines the characteristics of the users under the headings of age; sex; religion; race, and class; family characteristics; school and extracurricular activities; and alienation. Correcting the underlying emotional disorder of the glue sniffers when it exists, educating parents and children to the potential dangers and making the substances less available on open store shelves are a few of the recommendations made.

56. Brewer, W. R., Picchioni, A. L., and Chin, L.
 ARIZONA POISONING CONTROL INFORMATION CENTER.
 HAZARDS OF INTENTIONAL INHALATION OF PLASTIC CEMENT FUMES.
 Arizona Medicine (Scottsdale), 17(12): 747-748 (1 ref.), 1960.
 E - intentional - report - solvents - humans - intent. inhal. - euph. - cardiovasc. syst. - kid., liv. - resp. syst. - ataxia - dizz. - headache - tinnitus
 A-1591.

Intentional inhalation of plastic cement vapours concerns law enforcement officials, parents, educators, and physicians. The fad is widespread but the exact prevalence is impossible to determine. Toluene is the main ingredient. Inhalation may result in euphoria but also headaches, giddiness, vertigo, ataxia, tinnitus, and more severe symptoms of motor disturbances. Driving is a hazard. Death may result from ventricular fibrillation as well as respiratory failure as the solvents may sensitize the heart to epinephrine. Many solvents, such as ethylene dichloride and methyl cellosolve, can cause fatal liver and/or kidney damage. Youths should be warned of the dangers. Statistics concerning 82 poisoning cases from all causes in Arizona in September 1960 are reported. Most were due to accidental ingestion of medicines, household cleaners, cosmetics, or pesticides. A few concerned petroleum distillates,

paints, varnishes, and solvents.

57. Brilliant, L.
 NITROUS OXIDE AS A PSYCHEDELIC DRUG.
 New England Journal of Medicine (Boston), 283(27): 1522 (0 ref.),
 1970.
 E - intentional - lett. ed. - anesth. - humans - desc. admin. -
 death B-1962.

Observations of 75 young people who used nitrous oxide as a consciousness-expanding experience are noted in this letter. Most were multiple drug users. Less than 10 had not used LSD-like drugs. Nitrous oxide, 100%, was used (30% being necessary for analgesia). When large tanks were not available, the propellant from whipped cream cans was used. Two deaths due to asphyxiation occurred due to the method of inhalation but physiological effects in others were negligible. A report of a fatality due to "bone marrow depression" in a person who used as much as 420 gallons a week is given. Experimenters defend its use and think that the term "laughing gas" is a misnomer considering the number of serious historical figures who used the gas for self-experimentation.

58. Broser, F.
 ÜBER DIE ÄTHERSUCHT UND IHRE BEZIEHUNGEN ZUM
 CHRONISCHEN ALKOHOLISMUS. [On ether addiction and its re-
 lation to chronic alcoholism].
 Nervenarzt (Berlin), 20(3): 113-122 (52 ref.), 1949.
 G - intentional - gen. - case hist. - review - anesth. - gas. -
 humans - adults - female - male - intent. inhal. - reg. use - toler.
 - euph. - hallu. - impair. - hosp. - death A-1592.

The first reported case is that of a 43 year old man who had been accustomed to inhaling ether for 8 years. In the 6 months prior to his appearance in the clinic he had increased his dosage considerably (up to 2,500 g. per inhalation, lasting from 1/2 to 12 hr. and more). At various times, the patient had experimented with such substances as chlorethyl, chloroform, carbon tetrachloride, gasoline, "cohāsan", and an unspecified lacquer thinner, all of which were inhaled, but had rejected them either because of their too rapid effect or their unpleasant after-effects. Physical and psychological tests were performed and the patient submitted himself to a 3 month cure. Subsequently, he reported the frequent recurrence of hallucinatory visions which resembled those he had known during his ether experiences although the brightness, variety, and intensity of the colours, and the clarity and sharpness of the contours were

diminished. The second case was a 39 year old woman who had been a chronic ether drinker for a number of years. She claimed to have taken ether by inhalation on one occasion but had found the results unpleasant. The author proceeds to make some general observations on the basis of these and other recorded cases. It has been found that the quantity of ether generally inhaled ranges between 100cc. and 3,000cc., that tolerance is acquired, and that the addict suffers no immediate or long-term physical after-effects or withdrawal symptoms. A description of the progression of sensations during ether sniffing is given. The author concludes his paper by saying that until the present, ether addiction has been erroneously compared to chronic alcoholism, which has obscured the peculiar characteristics of both ether intoxication and the addict.

59. Brown, N. W.
 GASOLINE INHALATION.
 Journal of the Medical Association of Georgia (Atlanta), 57: 217-221 (19 ref.), 1968.
 E - intentional - gen. - case hist. - review - gas. - humans - adoles. - male - desc. admin. - intent. inhal. - reg. use - alien. - hallu. - impair. - trans. prob. - cult. depriv. - recidiv. - hosp. - EEG - psych. test - urin. test - nerv. syst. - dizz. - headache - nausea - weak. B-0715.

A review of the literature showed that autonomic responses to gasoline inhalation were: unpleasant taste, increased salivation, nausea, drowsiness, loss of appetite, and dizziness. Perceptual responses included a sense of lightness, a sense of spinning, altered shapes and colors, visual, auditory, and tactual hallucinations, and amnesia. A case of a fifteen year-old boy who had been sniffing for ten years is presented. By age ten, he was inhaling almost daily and kept a hose attached to a gasoline can for this purpose. The boy spent time alone and insisted that sniffing increased his reading and writing skills. While under the influence he could see Jesus and communicate with his dead sister, and felt his size change. Past history revealed parental arguments and the boy's father drank excessively. Similarities with other cases involving persons under twenty years of age, dominantly male, are pointed out. There was a high incidence of broken homes and lower than average I. Q. 's.

60. Brozovsky, M., and Winkler, E. G.
 GLUE SNIFFING IN CHILDREN AND ADOLESCENTS.
 New York State Journal of Medicine (New York), 65(15): 1984-1989 (10 ref.), 1965.

E - intentional - res. pap. - case hist. - solvents. - humans - child. - adoles. - female - male - desc. admin. - intent. inhal. - reg. use - toler. - depress. - pers. prob. - hallu. - impair. - cult. depriv. - peers - low. class - hosp. - psychother. - EEG - bone mar. - cardiovasc. syst. - kid., liv. - nausea - tinnitus - vomit.

B-1958.

Since the first reference to glue sniffing in 1962, reports have emphasized the toxic effects and the chemical composition of the glues. This paper concentrates on the neuropsychiatric and the social factors in a study of the 17 of 205 male admissions (9-16 years of age) to a children's psychiatric unit in New York, in which glue sniffing was involved along with 2 girls from the female admissions. Most came from a background of severe emotional deprivation, all were at the lowest economic level and 58% were Puerto Rican. They had indulged from a few weeks to 2 years. Many developed tolerance, and 8 also drank alcohol. Alcoholism was a trait of at least 1 parent in 37% of the families. 74% of the children were diagnosed as schizophrenic or otherwise psychotic. Motives included replacing feelings of inadequacy and depression with euphoria, and obtaining anesthetic effect against corporal punishment. Some had hallucinations, usually terrifying, commencing with the first experience while others, indulging for years, had none. Abnormal EEG patterns disappeared in from 10 days to a few weeks paralleling disappearance of the acute brain syndrome. Epileptiform seizures occurred. Sniffing seemed to be a group habit, more prevalent among boys than girls. Homosexual behaviour sometimes resulted. Treatment consisted of attempts at environmental manipulation and psychotherapy. There was no clearcut withdrawal syndrome.

61. California State Legislation.

ENACTED LEGISLATION. GLUE OR CEMENT.

California State Legislation, Assembly Bill No. 349, Amendment to the Business and Professions Code, 3pp. (0 ref.), 1965.

E - intentional - report - solvents - legis. B-1959.

Any glue or cement containing toluene, or a substance with similar toxic effects, must be labelled "poison" unless the Department of Health has certified that it is malodorous or has sneeze provoking ingredients. This does not apply to glue sold as part of a model kit. No poison, as defined in the bill, can be sold or delivered to anyone under the age of 18.

62. Canadian Medical Association, Council of Community Health Care, Special Committee on Drug Misuse.
NON-MEDICAL USE OF DRUGS. WITH PARTICULAR REFERENCE TO YOUTH.
Canadian Medical Association Journal (Toronto), 101: 804-820 (123 ref.), 1969.
E - intentional - report - gas. - solvents - humans - desc. admin. - intent. inhal. - toler. - depend. - hallu. - impair. - deviant behav. - detect. - EEG - bone mar. - cardiovasc. syst. - kid., liv. - resp. syst. - anemia - ataxia - death - dizz. - urin. path. B-1963.

A report is presented on the non-medical use of drugs among adolescents and young adults, excluding such drugs as alcohol and narcotics. After clarifying some general terms, indicating the availability of drugs and assessing the dimension of drug use, the report continues in discussing the method of administration, the subjective, as well as the pathological effects of drugs. The drugs include solvents, stimulants, amphetamines, depressants, psychedelic drugs, and cannabis products. "Glue sniffing", or solvent inhalation is said to have become common among children and young adolescents who sniff the vapours of glues and plastic cements containing toluene and acetone in order to achieve intoxication. Similarly, lighter fluid, cleaning fluid, lacquer and varnish thinners and ethyl ether are abused by inhaling their vapours from soaked cloths or plastic bags. The effects they produce are elation, dizziness, confusion, slurred speech, ataxia, delusions, or stupor and loss of consciousness with increasing concentrations. Chronic use can cause intractable ulcers of the gums, lips or nasal mucosa, anorexia, hepatic damage, possible bone marrow depression, and persisting ECG abnormalities. Death can result from suffocation, pulmonary edema, respiratory or cardiac arrest. Tolerance and psychological dependence are prominent. It is concluded that the problem has become serious enough to restrict the sale of such products or to recommend addition of nauseants in them.

63. Chalout, L.
LES SOLVANTS ORGANIQUES. [The organic solvents].
Canadian Psychiatric Association Journal (Ottawa), 16(2): 157-160 (26 ref.), 1971.
F - intentional - gen. - gen. disc. - review - solvents - humans - child. - adoles. - desc. admin. - toler. - depend. - euph. - hallu. - impair. - deviant behav. - low. class - blood test - EEG - urin. test - anemia - death - dizz. - nausea - tinnitus - vomit. B-2073.

A review of the literature on solvent abuse notes the rapid increase

in incidence of inhalation of organic solvents among adolescents. Solvents are classified into five groups and the components of each are given: glues (most popular), fuels, solvents (especially nail polish remover), dilutants and paints, and ethyl ether. Beginners seek the choice which will produce the highest degree of satisfaction. Inhalation usually occurs in groups where a plastic bag containing glue from several tubes is passed around, and each subject inhales the fumes. Some prefer to be alone, in which case they often sniff rags soaked with the solvent. Care must be taken not to allow direct contact of the substance with nasal mucous membranes, lips, or gums, as irritation and even ulceration can occur. Intoxication is accelerated if the substance has been previously heated. The immediate effects are variable depending on the personality of the individual, quality and quantity of the substance, and include euphoric excitation, dizziness, fantasies, and hallucinations followed by a depressing state often accompanied by nausea, vomiting, and tinnitus. Acute intoxication may result in coma and even death. It is agreed unanimously that tolerance occurs but dependence is mostly psychological, rather than physical. Long-term complications are more psychological (chronic fatigue, apathy, depression, irritability, and anorexia). There is not substantial evidence proving serious long-term physical effects. Users are generally between the ages of 10 and 15, and come from minority ethnic groups, and families with lower socio-economic level. Release of inhibitions by sniffing often leads to aggressive tendencies and criminal behavior. Treatment should include psychological investigation of the user plus social and familial therapy. Laws for prevention are often ineffective but recommendations concerning education, control of sales and change of composition of the solvents are cited.

64. Chapel, J. L., and Taylor, D. W.

GLUE SNIFFING.

Missouri Medicine (St. Louis), 65(4): 288-292, 296 (28 ref.), 1968.
 E - intentional - gen. - gen. disc. - gas. - solvents - humans -
 adoles. - female - male - desc. admin. - intent. inhal. - reg. use
 - chem. - toler. - charac. desc. - anx. - pers. prob. - depend. -
 disorient. - exhil. - euph. - hallu. - impair. - trans. prob. - cult.
 depriv. - deviant behav. - peers - low. class - urban - juven. -
 legis. - police - probat., rehab. - bone mar. - brain - cardiovasc.
 syst. - kid., liv. - resp. syst. - anemia - ataxia - death - dizz. -
 headache - nausea - tinnitus - tremors - vomit. B-0716.

Glue and gasoline sniffing is alarmingly common in people from the age of 6 to adulthood. 23 volatile organic solvents, listed, can cause irreversible damage and death. Benzene, toluene, xylene and carbon tetrachloride are the most deadly. Inhalation of 2% toluene or

xylene for 5 - 10 minutes is usually lethal. Acute effects are similar to those of alcohol intoxication inducing euphoria and motor incoordination. Many children feel able to fly and some become insensitive to pain. Visual hallucinations and illusions (often terrifying) are common. Chronic effects include elevated spinal fluid pressure, necrosis of the liver, hematuria and delinquent behaviour. Homosexuality, rape, homicide, and suicide occur. Tolerance develops, leading to psychological dependence, however, physiological addiction seems rare. Personality predisposition primarily distinguishes the normal adolescent "one timer" from the habitual users. The latter are usually boys, in large urban areas, often from a disorganized slum family with high frequency of alcoholism. References to laws are given, but their effectiveness is in doubt. Psychotherapy and community work to remove the causes of the overpowering need to escape reality is advised. Personality deficits are often environmentally produced.

65. Chapel, J. L., and Thomas, G.
AEROSOL INHALATION FOR 'KICKS'.
Missouri Medicine (St. Louis), 67(6): 378-380 (3 ref.), 1970.
E - intentional - gen. - gen. disc. - review - solvents - humans -
adoles. - desc. admin. - intent. inhal. - acute dos. - chem. -
toxicol. - CNS - death - nausea - tremors - vomit. - weak. B-1881.

Concern over an increase in inhalation of gases used as propellants in various aerosol bombs is expressed. Freon, used to chill cocktail glasses, is the most abused. It may cause death due to asphyxiation or aspiration of vomitus. Deaths of 2 college students are described and 6 other deaths, between November and December of 1967 are mentioned. Laryngo-spasm, partial anoxia, and damage to the oral cavity, respiratory tract, or lung tissue may occur. CNS depressant effects, and liver or kidney damage may result from chronic abuse. Qualitative effects are similar to those of carbon tetrachloride and chloroform. There are few reports on the amount required for the lethal "kick". The case of a 15 year old who inhaled Bactine, a disinfectant containing 3.7% isopropanol, which is commonly used and which is a very toxic solvent, is described.

66. Christiansson, G., and Karlsson, B.
"SNIFFING" - BERUSNINGSSÄTT BLAND BARN. ["Sniffing"
as a method of intoxication among children].
Lakartidningen (Stockholm), 54(1): 33-44 (21 ref.), 1957.
S - intentional - experimental - res. pap. - solvents - humans -
adoles. - male - intent. inhal. - reg. use - blood test - EEG - bone

mar. - brain - cardiovasc. syst. - kid. , liv.

A-1593.

A sample of 12 to 15 year old boys was physiologically examined who had inhaled thinner for a duration of up to 5 years for its intoxicating effects. These 32 boys were matched by age and social class with a control group. The results are presented. Reactive bone marrow changes were reported in 10 cases, enlargement of the liver in 5 cases. Hematologic findings in all the subjects were tabulated and the recorded changes were considered to be due to the high concentrations of toluene in the substance abused. Acute cerebral effects were registered by the EEG. Prolonged investigation of sniffers will determine whether observed changes are reversible and whether cerebral effects cause further damage. The use of sniffing as a method of intoxication is showing a tendency to increase.

67. Clearfield, H. R.

HEPATORENAL TOXICITY FROM SNIFFING SPOT-REMOVER (TRICHLOROETHYLENE).

American Journal of Digestive Diseases (New York), 15(9): 851-856 (13 ref.),

1970.

E - intentional - gen. - case hist. - solvents - humans - adoles. - adults - male - desc. admin. - intent. inhal. - reg. use - metabolism - disorient. - euph. - hallu. - hosp. - autops. - biopsy - blood test - EEG - urin. test - cardiovasc. syst. - kid. , liv. - death - nausea - vomit.

B-1958.

Death of a 22 year old man who had repeatedly inhaled Carbona (a spot remover containing trichloroethylene (TCE)) several times a day is reported. History and laboratory findings are detailed. Sniffing made him either "high" or syncope. Autopsy results revealed chronic effects to the liver and marked dilatation and degeneration of the convoluted tubules of the kidneys. The case of a 15 year old boy who sniffed Carbona for euphoric effects is also detailed. He was hospitalized after drinking a quart of beer and sniffing. He had sniffed glue a year before but there was no other known exposure to hepatotoxins. There was scleral icterus, epigastric tenderness, and total liver dullness of 11 cm. in the mid-clavicular line, proteinuria, high bilirubin and transaminase levels. A liver biopsy on the 8th hospital day showed granular yellow-brown pigment in Kupffer cells and portal areas and eosinophilic degeneration of liver cells around the central vein, and central lobular cellular degeneration. It is noted that such complications are rare when trichloroethylene is used for clinical anesthetic purposes suggesting that toxicity may be potentiated by alcohol and by the closed-circuit type of inhalation used by sniffers. Although glue is more commonly sniffed by teenagers, trichloroethylene can have

more serious complications, as described.

68. Clinger, O. W., and Johnson, N. A.
PURPOSEFUL INHALATION OF GASOLINE VAPORS.
Psychiatric Quarterly (Utica), 25: 557-567 (3 ref.), 1951.
E - intentional - gen. - case hist. - gas. - humans - adoles. -
male - intent. inhal. - reg. use - pers. prob. - hallu. - brok.
home - peers - hosp. - psych. test - dizz. A-1594.

A negro boy of sixteen was admitted to hospital because of addiction to gasoline fumes. He would sniff the vapours half a day at a time and all attempts to dissuade him, including chaining him did not help. According to his parents, the boy had become more sullen and antagonistic; however, he had no difficulties in school. The boy revealed a fear of the dark, preference for being alone, and bitterness toward parental punishment. Psychological testing showed low average intelligence. The patient said that he admired his brother who sniffed gasoline and followed his suggestion to do the same. When he inhaled the vapour, he could see people dressed in pretty clothes enjoying themselves. He was sent home but was re-admitted to hospital for a lengthy period after he started inhaling again. In a second case, a thirteen year old white boy was admitted because of gasoline inhalation. His mother had deserted the family eighteen months before he came to the hospital. Psychological test revealed a low I. Q. The boy reported sensations of power. Teachers and officials were successful in persuading him to participate in social activities. In both cases, inhalation seemed intended to create a fantasy type of experience in which hallucinations were prominent.

69. Collom, W. D., and Winek, C. L.
DETECTION OF GLUE CONSTITUENTS IN FATALITIES DUE TO "GLUE SNIFFING".
Clinical Toxicology (New York), 3(1): 125-130 (5 ref.), 1970.
E - intentional - experimental - res. pap. - solvents - humans -
adoles. - male - intent. inhal. - reg. use - pharmacol. - blood
test - chromatog. - CNS - death B-1964.

Methods of gas chromatography, spectrophotometry, headspace and direct injection used in the identification and quantitation of tissue levels of chemicals in the body in deaths due to glue sniffing are presented. Sensitivity to 2 mg. percent for benzene and 5 mg. percent for toluene established the headspace method as being the best. Analysis of samples of a 16 year old male who died from benzene vapours from rubber cement revealed a benzene concentration in

the blood of 94 μ g. /100 ml. and in the kidney of 550 μ g. /100 g. In a second case, the death of a 13 year old male was attributed to respiratory failure due to a combination of narcosis and suffocation as a result of airplane glue inhalation. The concentrations of toluene per 100 g. of tissue were 1.1 mg. in the blood, 4.7 mg. in the liver, 3.9 mg. in the kidney, and 4.4 g. in the brain.

70. Corliss, L. M.

A REVIEW OF THE EVIDENCE ON GLUE-SNIFFING - A PERSISTENT PROBLEM.

Journal of School Health (Columbus), 35(10): 442-449 (20 ref.),

1965.

E - intentional - gen. - gen. disc. - review - solvents - humans - child. - adoles. - female - male - desc. admin. - intent. inhal. - reg. use - toler. - depend. - exhil. - euph. - hallu. - impair. - trans. prob. - deviant behav. - low. class - juven. - legis. - biopsy - psych. test - bone mar. - brain - cardiovasc. syst. - kid., liv. - nerv. syst. - anemia - ataxia - death - nausea - tinnitus - vomit.

B-1965.

Toxic components in glues, including aromatic and halogenated hydrocarbons, ketones, esters, and alcohols, are listed. Inhalation of gasoline, thinners, lighter fluid, and marking pencil fumes is mentioned as well. The incidence of glue sniffing, the related behavioral problems, symptoms, toxicity, and control are discussed on the basis of the first known report (Brewer, WR., Picchione, AL., and Chin, L., Arizona Medicine, 17(12): 747-748, 1960) and others. Boys, in urban centres, are the most frequent users and delinquency is common among them. Reversible acute neuropsychological edema; but controversy reigns regarding effects on the liver, kidney, brain, and bone marrow. Although tolerance develops, it is not a true physiological addiction. More glue sniffers turn to heroin than marijuana smokers. Initial effects of glue sniffing resemble alcohol intoxication. Mild visual and auditory hallucinations, muscular incoordination, anemia, pains, weight loss, and low blood pressure occur in some. As laws prohibiting use, or punishing juveniles have not solved the problem, a Denver juvenile court project is concentrating on correction of environmental causes (often poverty and broken homes) and on satisfying psychological needs by intensive group therapy. This may provide a model for nationwide application.

71. Cragg, J. , and Castledine, S. A.
 A FATALITY ASSOCIATED WITH TRICHLOROETHYLENE IN-
 HALATION.
 Medicine, Science and the Law (London), 10(2): 112-114 (8 ref.),
 1970.
 E - intentional - gen. - case hist. - solvents - humans - adoles. -
 male - intent. inhal. - reg. use - autop. - blood test - chromatog.
 - urin. test - cardiovasc. syst. - death B-1966.

A 19 year old boy had sniffed industrial trichloroethylene (TCE) for half an hour prior to swimming two lengths of a pool. He had difficulty breathing and died suddenly, probably due to cardiac arrhythmia, particularly ventricular fibrillation, associated with the trichloroethylene inhalation. The heart was smaller than usual, as was the right main coronary artery, but there was no gross evidence of myocardial fibrosis or infarction. Aortic hypoplasia is a possible, but unlikely, cause of death. The brain was oedematous and had more petechiae than usual. The liver showed no necrosis, but moderate serous hepatitis; the kidney was congested. No trichloroethylene was detected in the tissues, blood, or urine. The vapour was presumably absorbed or even volatilized by the resuscitation measures used. A metabolite, trichloroacetic acid was detected in the blood, liver, renal fat, and urine but not in the lung or stomach contents. He had inhaled trichloroethylene at other times and reported double vision. Most fatalities after inhalation or ingestion of trichloroethylene have been in industry, but reports of cardiac rhythm irregularities caused by trichloroethylene and of deaths from circulatory failure associated with trichloroethylene anesthetics are cited. Differences between effects of crude and pure anesthetic trichloroethylene are discussed. Heat or strong light may break down the noxious products such as phosgene and hydrochloric acid in the former.

72. Cragg, J.
 SNIFFING SYNDROME.
 British Medical Journal (London), 2(5757): 334 (2 ref.), 1971.
 E - intentional - lett. ed. - solvents - humans - adoles. - male -
 intent. inhal. - reg. use - autop. - cardiovasc. syst. - death
 B-2078.

Referring to the editorial in the British Medical Journal (London), 2(5755): 183, 1971, entitled SNIFFING SYNDROME, the author states that the sniffing of trichloroethylene can lead to death. He refers to his article A FATALITY ASSOCIATED WITH TRICHLOROETHYLENE INHALATION in Medicine, Science and the Law (London), 10: 112-114, 1970. The article concerns a youth who

died suddenly apparently due to a cardiac arrhythmia, particularly ventricular fibrillation after sniffing the solvent. The author feels the editorial was timely and that the dangers of sniffing should be stressed.

73. Crooke, S. T.

SOLVENT INHALATION.

Texas Medicine (Fort Worth), 68(7): 67-69 (0 ref.), 1972.

E - intentional - gen. - gen. disc. - review - solvents - humans - child. - adoles. - adults - desc. admin. - intent. inhal. - toler. - depend. - exhil. - euph. - hallu. - impair. - EEG - bone mar. - CNS - kid. , liv. - resp. syst. - headache - tremors - urin. path.

B-2158.

The author reviews the literature concerning solvent sniffing. The method of placing a paper or plastic bag containing the solvent over the head is the most dangerous method. The vapor concentrations experienced with this method are considerably higher than the anesthetic threshold levels creating the danger of loss of consciousness and asphyxiation. There is no correlation between the type of criminal record of the sniffer and the practice, itself. One etiologic factor which has been frequently found is emotional deprivation suffered by the youth. Respiratory, cardiovascular, and urinary system damage has been reported. The possibility that disulfiram might be used in treatment of the physical complications of this practice is suggested.

74. Danto, B. L.

A BAG FULL OF LAUGHS.

American Journal of Psychiatry (Hanover, N. H.), 121(6): 612-613 (1 ref.), 1964.

E - intentional - gen. - gen. disc. - anesth. - humans - female - intent. inhal. - euph.

A-1596.

Inhalation of nitrous oxide released into plastic bags from cartridges (used in restaurants to whip cream) is reported to produce convulsive laughter, euphoria, and increased sexual appetite in homosexuals and others. The contents of one 2 1/2" cartridge produce effects lasting 2 to 3 minutes. Some inhaled more but none showed any ill effect such as muscle weakness or unconsciousness. Nitrous oxide is a weak anesthetic, but its potency increases with barbiturate medication or a high concentration of oxygen. Death from asphyxia or psychosis from brain damage may then result. Circulatory and respiratory impairment, high blood pressure, nausea,

and vomiting may occur. The fad may be a response to legal sanctions on other drugs and is comparatively safe, although potentially addictive. Abuse may lead to a chronic brain syndrome.

75. David, M.
 THE GLUE SNIFFERS.
 RN, A Journal for Nurses (New York), 28(10): 82-85, 121 (0 ref.),
 1965.
 E - intentional - gen. - gen. disc. - solvents - humans - adoles. -
 adults - male - desc. admin. - intent. inhal. - euph. - hallu. -
 cult. depriv. - detect. - juven. - brain - cardiovasc. syst. - kid.,
 liv. - nerv. syst. - resp. syst. - dizz. - headache - tremors
 B-1967.

A nurse summarizes answers from Dr. Sokol of Los Angeles, about glue sniffers. They are usually boys, ages 8 to 18, from all economic levels. Sniffing is a symptom of a deep seated emotional disturbance; an unstable home, rejection, and poverty being contributory factors. Abusers seek euphoria, hallucinations, and sexual gratification. Toluene and other components are listed. These may cause CNS depression, damage to all main organs, and possibly leukemia. Methods of inhaling are described. Deaths from congestion of the bronchial tree and fatal accidents due to "crazy" behavior occur. Short-term therapy with sedatives and tranquilizers, and treatment of the common anemic condition succeeds in encouraging withdrawal. Green-gray skin, coughing, sneezing, and an odor of glue, make detection easy.

76. Davis, R.
 REPORT ON THE PROBLEM OF GLUE SNIFFING IN CHILDREN
 AND THE WORK OF THE NEW YORK CITY POLICE DEPARTMENT
 AND ITS YOUTH INVESTIGATION BUREAU IN COMBATING THIS PROBLEM.
 In: A Conference; Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 104-110 (0 ref.), 1967.
 E - intentional - report - case hist. - solvents - humans - child. -
 adoles. - male - intent. inhal. - reg. use - brok. home - cult. depriv. -
 deviant behav. - low. class - urban - juven. - legis. - police
 - probat., rehab. - death B-1968.

The increasing popularity and dangers of glue sniffing was recognized by the New York police in 1963. In 1962, the Youth Bureau recorded 780 cases and in 1963, 2003. Preventive measures proved ineffective. Legislation brought in in 1964-65 forbids sale

of glue to anyone under 18, unless he has a hobby card, and forbids the sale of glue or cement for the purpose of sniffing. A table lists the number of glue sniffers between 1962-66. Males predominate. Aggressive police action apparently accounts for the decrease since 1964. Seven case histories are provided indicating broken homes, truancy from school and two accidental deaths from falling from high buildings while intoxicated. Sniffing is symptomatic of social illness. The majority of sniffers were of lower socio-economic status. Rejection and neglect by parents is common. Police refer disturbed children to appropriate agencies. A majority are involved in other delinquencies. Vigorous law enforcement and increased community involvement is advocated, otherwise, glue sniffing may lead to addiction to other drugs, eg. marijuana or heroin in later years.

77. Davis, R. F.

THE NEW YORK CITY EXPERIENCE.

Juvenile Court Judges Journal (Chicago), 18(2): 53-55 (0 ref.), 1967.
E - intentional - report - case hist. - solvents - humans - child. -
adoles. - male - intent. inhal. - reg. use - brok. home - cult. dep-
riv. - deviant behav. - low. class - urban - juven. - legis. - police
- probat., rehab. - death B-1969.

The increasing popularity and dangers of glue sniffing was recognized by the New York police in 1963. In 1962, the Youth Bureau recorded 780 cases and in 1963, 2003. Preventive measures proved ineffective. Legislation brought in in 1964-65 forbids sale of glue to anyone under 18, unless he has a hobby card, and forbids the sale of glue or cement for the purpose of sniffing. A table lists the number of glue sniffers between 1962-66. Males predominate. Aggressive police action apparently accounts for the decrease since 1964. Seven case histories are provided indicating broken homes, truancy from school and two accidental deaths from falling from high buildings while intoxicated. Sniffing is symptomatic of social illness. The majority of sniffers were of lower socio-economic status. Rejection and neglect by parents is common. Police refer disturbed children to appropriate agencies. A majority are involved in other delinquencies. Vigorous law enforcement and increased community involvement is advocated, otherwise, glue sniffing may lead to addiction to other drugs, eg. marijuana or heroin in later years.

78. Dérobert, M. L.
 MORT AU COURS D'UNE INHALATION TOXICOMANIAQUE AU
 TRICHLORÉTHYLÈNE. [Death during addictive inhalation of tri-
 chloroethylene].
 Annales de Médecine Légale (Paris), 36(6): 293-294 (1 ref.), 1956.
 F - gen. - case hist. - solvents - humans - adults - male - intent.
 inhal. - reg. use - impair. - autop. - cardiovasc. syst. - death
 A-1597.

The body of a 46 year old man was found bent over the edge of a vat containing trichloroethylene. The deceased had been in the habit of visiting local factories at night, after the departure of the other workers, for the purpose of inhaling fumes from the still tepid vats of trichloroethylene. His friends reported that he had no alcohol habit and had never drunk the solvent, and that these inhalations had become increasingly frequent and prolonged. An autopsy revealed minor lesions of pulmonary edema, a meningeal edema, and a small menigeal hemorrhage. Buccal and pharyngeal mucous was extremely congested. Lesions of the face, hands and forearms showed a veritable dissolution of the cutaneous and subcutaneous fatty elements. The man had been inhaling the solvent for several years claiming that it helped his headaches and, later on especially, the sudden violent pains which occurred in his lower limbs and which, according to the description given by the witnesses, would seem to resemble polyneuritic pains.

79. Dillon, J. B.
 NITROUS OXIDE INHALATION AS A FAD. DANGERS IN UN-
 CONTROLLED SNIFFING FOR PSYCHEDELIC EFFECT.
 California Medicine (San Francisco), 106(6): 444-446 (0 ref.), 1967.
 E - intentional - gen. - case hist. - anesth. - humans - male - in-
 tent. inhal. - trans. prob. B-1970.

In a letter to the author, a pastor relates the story of a young man who had been experimenting with nitrous oxide. Marital problems, tension, and accidental availability turned the man to gas and he used one six-pound cylinder once a week--all in one day. It made him happy, relaxed, and increased his sensory perception. He had nine auto accidents while under the influence with the tube in his mouth. The author replied that the patient lost the faculty for making logical decisions probably because he was using nitrous oxide without supplemental oxygen, and as a direct result of the effects of the nitrous oxide itself. He suggested that the police be notified.

80. Dodds, J., and Santostefano, S.
A COMPARISON OF THE COGNITIVE FUNCTIONING OF GLUE-SNIFFERS AND NONSNIFFERS.
Journal of Pediatrics (St. Louis), 64(4): 565-570 (12 ref.), 1964.
E - intentional - experimental - res. pap. - solvents - humans -
adoles. - male - intent. inhal. - reg. use - euph. - impair. - psych.
test - CNS - dizz. A-1598.

Reports discussing brain, kidney or liver damage, anemia and abnormal EEGs after glue sniffing are not well substantiated, and these effects probably are less hazardous than the emotional problems which lead to glue sniffing. These can cause dangerous behavior while intoxicated, including crime, and lead to alcohol and narcotic addiction later, unless treated. A wide range of cognitive functions were tested in 12 delinquents aged 12 - 16 years, who had been chronic sniffers for 3 - 42 months (an average of 82 intoxications) and a control group. Thinking, perception, memory, attention span, problem solving abilities, and visual motor coordination were thoroughly measured. The tests applied to functions most vulnerable to organic brain damage. Effects on the cerebellum would not be revealed by the applied tests, but neither peculiarities in gait, nor tremors were noted. Results did not relate to age or I. Q. The performance of the sniffers was strikingly similar to that of the controls, and there was no correlation between the number of intoxications and performance. Concentration primarily on relieving critical social and psychological causes, rather than on organic effects, is advocated.

81. Dollery, C. T.
SNIFFING SYNDROME.
British Medical Journal (London), 2(5757): 334 (5 ref.), 1971.
E - intentional - experimental - lett. ed. - solvents - mammals -
acute dos. - toxicol. - cardiovasc. syst. B-1971.

Referring to the editorial in the British Medical Journal (London), 2(5755): 183, 1971 entitled SNIFFING SYNDROME, the author states that the real concern of solvent sniffing is the ability of fluorinated hydrocarbons to sensitize the heart to adrenaline. In such an experimental situation, conscious dogs developed ventricular tachycardia or fibrillation. He feels that because of the high concentration needed and the low toxicity level of the sprays commonly used, there is little need to be concerned.

82. Done, A. K.
 A BIOMEDICAL VIEW OF SUBSTANCE ABUSE.
 Juvenile Court Judges Journal (Chicago), 18(2): 50-52 (0 ref.), 1967.
 E - intentional - gen. - gen. disc. - solvents - humans - intent. inhal. - reg. use - cult. depriv. - mid. , upper class - EEG - brain
 - urin. path. B-1972.

The medical and social aspects of substance abuse are discussed, with specific reference to solvent sniffing. The author expresses his views on substance abuse, then discusses solvent sniffing, elaborating on the problem in general, as well as on its medical, psychological, and social aspects. Solvent sniffing enjoys widespread popularity among children due to the easy availability of the materials. Thinner is generally preferred to glue due to its cheaper price. In both instances, toluene is the most favored constituent, and is considered by the author to be the "safest" among all organic solvents, such as acetone, naphtha, benzene, acetates, and chlorinated hydrocarbons, all of which can cause serious damage to a number of organ systems, including the heart. The author denies the possibility of toluene causing significant liver or bone marrow damage, anemia, or residual organic brain damage. Toluene appears to cause only superficial and transient abnormalities of little significance which disappear when exposure is discontinued. On the other hand, chronic toluene sniffing can cause personality deterioration to a startling degree. As far as psychological and sociological studies are concerned, the most striking observation made by the author is the almost universal occurrence of father deprivation among the population of solvent sniffers sampled. No further elaboration on this observation is made.

83. Done, A. K.
 PRESENTATION BEFORE CONFERENCE ON SUBSTANCE ABUSE
 PRACTICES AMONG ADOLESCENTS.
 In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 44-50 (0 ref.), 1967.
 E - intentional - report - solvents - humans - intent. inhal. - reg. use - pharmacol. - cult. depriv. - mid. , upper class - EEG - bone mar. - kid. , liv. - urin. path. B-1973.

A list of psychedelic substances including their source, relative ability to cause hallucinations, judgement disorganization, motor impairment, physical dependence and long-term toxicity is given. The problem of abuse cannot be reduced to particular effects. If addiction is the sole criterion of undesirability, LSD, marijuana, and amphetamines could not be included. On the other hand, bar-

biturates, and narcotics rarely produce psychotic effects, yet are addictive. There is more evidence of organic defects from chlorinated hydrocarbons and benzene (which like naphtha and gasoline may cause sudden death due to effects on the heart) than from toluene. In a group of boys sniffing solvents, neither liver, kidney or organic brain damage was noted, although transient EEG changes and spinal fluid pressure was observed. There was a startling degree of personality deterioration in some but no measurable physical relation. The basic defect or "common denominator" was emotional (particularly father) deprivation due either to his absence from the home, preoccupation with business, or alcoholism.

84. Durden, W. D. , Jr. , and Chipman, D. W.
 GASOLINE SNIFFING COMPLICATED BY ACUTE CARBON TETRACHLORIDE POISONING.
 Archives of Internal Medicine (Chicago), 119(4): 371-374 (18 ref.),
 1967.
 E - intentional - gen. - case hist. - gas. - solvents - humans -
 adoles. - male - intent. inhal. - reg. use - exhil. - euph. - hallu. -
 brok. home - peers - juven. - hosp. - biopsy - blood test - urin.
 test - headache - nausea - urin. path. - vomit. B-1974.

Purposeful inhalation of gasoline fumes was first reported in 1951. A case report of a hospitalized 19 year old marine enlisted man with a 7 year history of gasoline sniffing is presented. He had the traumatic, unstable home life and low I. Q. typical of many sniffers. He was an incorrigible delinquent and had used heroin. He had auditory and visual hallucinations. Once, after drinking, when no gasoline was available, he inhaled a household solvent which contained 60 percent carbon tetrachloride. The potentiation of its effects by alcohol are well known. He developed acute pancreatitis, hematuria, proteinuria, and jaundice, convulsions, and kidney failure. The patient was discharged after 45 days in hospital. Sniffing is not a true addiction; yet the urge can become overpowering despite some frightening effects. Exotic sexual fantasies and euphoria are sought. Chronic industrial exposure may cause hematologic abnormalities, probably due to benzene. An aid to diagnosis is breath analysis by infrared spectrometer or vapor phase chromatograph, which remains sensitive even weeks after inhalation.

85. Easson, W. M.
 GASOLINE ADDICTION IN CHILDREN.
 Pediatrics (Springfield, Ill.), 29: 250-254 (8 ref.), 1962.
 E - intentional - gen. - case hist. - gas. - humans - child. - adoles. - male - intent. inhal. - reg. use - charac. desc. - alien. -

anx. - pers. prob. - depend. - euph. - hallu. - cult. depriv. - low.
class - rural - hosp. - EEG - psych. test - urin. test A-1599.

The causes behind gasoline addiction in 7 cases previously reported (all boys) and 2 new hospitalized cases are analysed. Unsettled homes with fathers having chronic business or social failures predominate. Many fathers beat their children and are alcoholics. The boys cannot tolerate anxiety or frustration. Immature self-centred "lone wolf" personalities, with emotions characteristic of narcotic addicts are common. Easy access to gasoline on farms is a factor. No specific withdrawal reactions are noted. Psychological dependence occurs. An 11 year old boy (who had hallucinations when he had the flu at age 7) was first thought to be schizophrenic but had been inhaling gas fumes for the previous 4 months. He was comforted by the visual and auditory hallucinations and felt "nice and funny". The EEG was normal and no evidence of lead poisoning or other abnormality was found. A 14 year old boy had inhaled gasoline since the age of three whenever he was anxious or lonely. It made him feel "nice and warm". He denied having hallucinations but had a slightly abnormal EEG. Diagnostic tests are described in some detail.

86. Edwards, R. V.

A CASE REPORT OF GASOLINE SNIFFING.

American Journal of Psychiatry (Baltimore), 117: 555-557 (3 ref.),
1960.

E - intentional - gen. - case hist. - gas. - humans - adoles. - male
- intent. inhal. - reg. use - charac. desc. - pers. prob. - hallu. -
impair. - cult. depriv. - low. class - psych. test A-0079.

A case report of a 17 year old boy who had sniffed gasoline vapors, and smoked since the age of 6, is given. He became anemic. He drank alcohol excessively from the ages 14-16 years and had a life-long manic hyperactivity to achieve greatness as expected by his mother. He said that sniffing 3 - 4 hours (inhalation lasted 3 - 5 minutes) over a 48 hour period, 3 - 4 times a year stimulated him, allowing him to think clearly and feel that he could do anything. He occasionally lost consciousness. He worked on a farm with easy access to gasoline. There was no evidence of organic mental syndrome but psychological tests revealed him as hypomanic or manic and very anxious. He and his mother were killed in a car accident before hospitalization could be arranged. References are provided to 3 other cases. There was no evidence of lead poisoning or liver disease. One had an abnormal EEG and all reported hallucinations. All 3 discontinued sniffing after their emotional conflicts were treated. A 6 year old who had sniffed for 18 months is also briefly

mentioned.

87. Eichert, H.
 TRICHLOROETHYLENE INTOXICATION.
 Journal of the American Medical Association (Chicago), 106(19):
 1652-1654 (10 ref.), 1936.
 E - intentional - gen. - case hist. - review - solvents - humans -
 adults - female - male - intent. inhal. - reg. use - disorient. -
 hallu. - impair. - hosp. - urin. test - CNS - ataxia A-1600.

A case of a retired business executive, aged 52, who had led a tense and active life is presented. Three years before admission to hospital, he complained of facial pain and a diagnosis of trigeminal neuralgia was made. Two years before admission, he began using a preparation of trichloroethylene prescribed by his physician but he had gradually increased the inhaled dosage until he became drowsy and listless. He used 120 cc. during the two days before admission and developed thickness of speech, difficulty in concentration, and unsteadiness. With the discontinuation of trichloroethylene, mental clarity was restored within three days. In a second case, trichloroethylene was prescribed for a 52 year old woman who complained of facial pain. Over a period of days, she used 180 cc. resulting in acute hallucinations and change of personality. Although usually composed, the patient scowled at her family and replied to their remonstrations by growling and making queer noises. She half walked and half crawled upstairs and, having reached the top, fell backward and fractured her spine. At no time after this did she complain of facial pain.

88. Ellison, W. S.
 PORTRAIT OF A GLUE SNIFFER.
 Crime and Delinquency (New York), 11(4): 394-399 (9 ref.), 1964.
 E - intentional - report - case hist. - recom. - solvents - humans
 - adoles. - male - intent. inhal. - reg. use - charac. desc. - anx.
 - passiv. - depend. - brok. home - cult. depriv. - low. class -
 juven. - legis. - recidiv. - couns. - probat., rehab. - CNS - kid.,
 liv. - resp. syst. - ataxia - tinnitus A-1601.

The objectives of a study of 48 of the 100 cases of glue sniffing referred in one year to the Santa Clara County Juvenile Probation Department were: education, rehabilitation in a group counseling program, and research. Many of the basic characteristics of alcoholics and drug addicts were found. Boys with low I. Q. and low socio-economic backgrounds (problems of which glue sniffing was one symptom) predominated. They had weak personalities. Pro-

jective tests of these youngsters show anxiety, passivity, a withdrawal from social situations, disorganization, a limited capacity for learning, and fragmented or brittle personality which tends to break down under stressful situations. Of the crimes that were committed, several were undertaken while the youths were "high". Some sniffers had also experimented with other drugs. Many were Mexican or of other minority groups from areas where delinquency rates were high, and where the standards of health, education, and welfare were low. 3 typical cases are presented. In 60% of all the cases the mother was the only parent at home. Custody and intensive counseling can break the habit but it may be resumed later under stress. Closer contact with schools, law enforcement and public health officials, and intensive work with the parents is urged. Obvious symptoms of watery eyes, giddiness, stupor, incoherent speech, or "hopped up feelings" should not be ignored. Long term physical effects are unknown.

89. Elosuo, R.
 NUORISON TINNERINKÄYTÖSTÄ. [Use of thinners among the youngsters].
 Suomalainen Laakariseura Duodecim (Helsinki), 21: 1643-1646 (12 ref.), 1966.
 Fi - intentional - gen. - case hist. - review - solvents - humans - child. - adoles. - intent. inhal. - reg. use - anx. - pers. prob. - depend. - euph. B-1975.

The author shortly reviews the Swedish experience of thinner sniffing which started in 1955. The thinner most widely used for sniffing contained toluene, butyl acetate and alcohol. The preference for thinner over other substances that could be abused through inhalation is briefly discussed. The effects of toluene and the dosage required for its euphoric sensations are described. Case reports from the literature are presented and the etiology of dependence is discussed in the light of a 14 year old boy of average intelligence who sniffed thinner. His mother was domineering, frigid, and favored the boy's younger brother while the father favored him. The patient showed signs of anxiety, insecurity, and ambiguity towards his masculine identity. A follow-up study two years later showed hypomanic verbalization, confabulation, explosive effects, and a weakened sense of reality in the boy.

90. Ely, D. F.
 SUBSTANCE ABUSE - A COMMUNITY PROBLEM. THE
 SCHOOL.
 In: A Conference: Inhalation of Glue Fumes and Other Substance
 Abuse Practices Among Adolescents. Denver: U. S. Department of
 Health, Education, and Welfare, 124-125 (0 ref.), 1967
 E - intentional - report - recom. - solvents - humans - adoles. -
 intent. inhal. - courts - police - probat. , rehab. B-1976.

Guidance, discipline, and utilization of community agencies were evaluated by educators with respect to substance abuse (narcotics, alcohol, glue, and LSD) in or around schools. Training the staff to recognize symptoms of abuse is advocated. Relations with police, and the effects of police action are discussed. Difficulties in follow-up procedures are mentioned. Students on probation present a special problem to the schools.

91. Ewald, C. A.
 EIN AETHERATHMER. [An ether sniffer].
 Berliner Klinische Wochenschrift (Berlin), 12(11): 133-135 (0 ref.),
 1875.
 G - intentional - gen. - case hist. - anesth. - humans - adults -
 male - intent. inhal. - reg. use - toler. - depend. - hallu. - impair.
 - hosp. - blood test A-1603.

A 32 year old man came to the clinic with complaints of exhaustion, weakness, loss of appetite, and muscle tremor. A physical examination revealed no apparent cause but it was noted that the patient smelled strongly of ether to which he admitted to have inhaled for years. The patient's behavior betrayed no ostensible signs of his addiction. His initial experimentation had been prompted by the reading of a popular treatise on the effects of ether while he was still a student of philosophy and aesthetics at University. The inhalation of about 2 1/2 oz. of sulfuric ether had been sufficient to produce a series of vivid hallucinations which apparently derived mainly from his theological-mystical ideas. Another aspect of the experience was the elimination of matter, space, and time. There were no ill after-effects at this time or later, but he was subsequently incapable of recapturing the intense dream-world he first knew despite larger and more frequent doses. Lately, he consumed about 2 1/2 pounds of it each day. His characteristic mode of hallucination was a trance-like movement from the realm of reality into the ideal which the author claims is a common denominator of experiences previously described in literature. The individual directs himself toward the sphere where he is accustomed to seeking out his ideal according to his educational standard and habit.

The nature of the phantasms is, therefore, dictated by the association of the individual consciousness which for the patient in question, expressed itself within narrowly circumscribed bounds. From the beginning, his hallucinations were exclusively mystical and free from any erotic elements. Results of the author's experiment on the patient to connect the effect of ether on his vascular system and its secretion are given.

92. Faucett, R. L. , and Jensen, R. A.
 ADDICTION TO THE INHALATION OF GASOLINE FUMES IN A CHILD.
 Journal of Pediatrics (St. Louis), 41: 364-368 (1 ref.), 1952.
 E - intentional - gen. - case hist. - gas. - humans - child. - male
 - intent. inhal. - reg. use - anx. - depress. - hallu. - impair. -
 cult. depriv. - rural - hosp. - psychother. - EEG - psych. test -
 urin. test - CNS A-1604.

Reference is given to Machle's review of the literature on industrial intoxications and a case history of a farm boy age 11, who has inhaled gasoline fumes since age 5, is presented. At first he was curious, then needed it to overcome anxiety and depression. At first, hallucinations were of friendly gnome-like men, then they became hostile and threatening. He often breathed until unconscious. He was hospitalized after 3 weeks of intensive inhalation after his parents' recent divorce (the father being an alcoholic) and his grandfather's death. Anxiety and depression showed in the Rorschach test and he had an abnormal EEG suggesting brain damage. He had a low I. Q. He was treated with intravenous sodium amytal which was highly effective as an aid to getting data on the psychogenic factors involved in the etiology of the case. The repressed material, thus revealed, was gradually introduced into his treatment sessions and psychotherapy was highly successful. He did not resume inhaling after discharge. Sodium amytal is only advised when irreversible damage is feared or when facilities for long term therapy are not available. Risks are cited.

93. Fejer, D.
 DRUG USE AMONG HIGH SCHOOL STUDENTS IN NORTH BAY, ONTARIO.
 Addiction Research Foundation (Toronto), Unpublished Paper, 22 pp. (7 ref.), 1971.
 E - intentional - experimental - res. pap. - solvents - humans -
 adoles. - female - male - intent. inhal. - occas. use - reg. use
 B-2159.

A survey was conducted involving 2,576 grade 9, 11, and 13 students in North Bay, Ontario. An anonymous questionnaire of drug use, social and psychological characteristics was filled out in May of 1971. The drugs included in the survey were: alcohol, tobacco, marihuana, glue, other solvents, barbiturates, opiates, speed, stimulants, tranquillizers, LSD, other hallucinogens, and MOT (monoxtriptamate - a non-existent drug). Alcohol and tobacco were the most commonly used drugs followed by marihuana. Tobacco and marihuana were the most frequently used drugs. Less than one percent of the students reported using MOT - the non-existent drug. Tranquillizers were the only drugs used more by the girls than the boys. Alcohol, marihuana, and tranquillizer use increased with the grade level while glue and solvent use decreased. Users and non-users of alcohol and marihuana were compared in regards to their social and demographic characteristics such as sex, grade, social class, religion, and extra-curricular activities. It was found that only a few of the total sample of students had sniffed glue or other solvents, the percentage of use being 1.8 and 3.5 percent, respectively. However, of those who did use glue, 20 percent reported using it 7 or more times in the last 6 months before the survey.

94. Fejer, D., Smart, R. G., and Whitehead, P. C.
 CHANGES IN THE PATTERNS OF DRUG USE IN TWO CANADI-
 AN CITIES: TORONTO AND HALIFAX.
 International Journal of the Addictions (New York), 7(3): 467-479
 (9 ref.), 1972.
 E - intentional - experimental - res. pap. - solvents - humans -
 adoles. - female - male - intent. inhal. - reg. use B-2062.

Several surveys of adolescent drug abuse in Toronto and Halifax were compared in an attempt to determine any trends that might exist over the period of time. The drugs in question were tobacco, alcohol, marijuana, stimulants, tranquilizers, glue, barbiturates, LSD, other hallucinogens, and opiates. The pattern of glue use had the most prominent change of all the drugs between the years 1968, 1969, and 1970 in the two cities. The practice decreased greatly in Toronto dropping from sixth to tenth position as the least used drug while in Halifax it increased 132 percent moving from sixth to fifth place rising above the use of tranquilizers. It could not be determined if education or the mass media had any role in the decline in the use of glue in Toronto.

95. Fishbein, M.
 GLUE-SNIFFING AND DRUG ABUSE.
 Medical World News (New York), 8: 112 (0 ref.), 1967.
 E - intentional - edit. - solvents - humans - male - intent. inhal. -
 depend. - low. class B-1977.

Comments on a conference held under the auspices of the Denver Juvenile Court reveal that half of the boys, ages 10 - 17 years, in Denver have experimented with glue sniffing. Motives relate to the struggle against the frustrated needs to belong and for power. The act is self-defeating and compares with other unlawful fads. Glues, and other substances listed, used for psychedelic or hallucinogenic properties, produce psychic dependence. Their toxic effects are only partly known. The need for early detection, and aid to the child and family, were emphasized. Remote aspects of problems resembling glue sniffing were examined. They are medico-social, and go deeper than the problem of immediate concern.

96. Freer, A. B.
 ABOUT GLUE SNIFFING.
 Children (Washington, D. C.), 10(5): 200-201 (1 ref.), 1963.
 E - intentional - edit. - solvents - humans - adoles. - male - intent.
 inhal. - legis. - bone mar. - kid. , liv. - nerv. syst. - death
 A-1605.

This note states that glue sniffing by young people was first reported in 1959. The fad has spread but no reliable statistics are available. The one reported death was probably due to suffocation by the plastic bag and not due to the glue's toxicity. Effects of glue sniffing described by Glaser and Massengale include: nausea, loss of weight, irritation of mucous membranes, distorted vision, dizziness, and unconsciousness. The National Clearing House for Poison Control Centers reports that the liver, kidneys, bone marrow, and the nervous system can be damaged. Ingredients of plastic cements are listed. Legal action and education are the controls considered.

97. Friedländer, J.
 HABITUELLER CHLOROFORMMISSBRAUCH. [Habitual chloroform abuse].
 Deutsche Medizinische Wochenschrift (Stuttgart), 33: 1494-1496
 (21 ref.), 1907.
 G - intentional - gen. - case hist. - anesth. - humans - adults - female - intent. inhal. - reg. use - impair. - trans. prob. - CNS -
 nerv. syst. - dizz. - headache - vomit. A-1607.

The 53 year old wife of a businessman consulted the author with complaints of severe headaches. She was found to be of very robust constitution and was suffering from hyperemic headaches, some cyanosis, heavy congestion, and moderate conjunctivitis. Further visits revealed that her abnormal complexion, which could not be attributed to syphilis or alcohol or tobacco misuse, stayed the same even during her headache-free periods. After a hiatus of 7 years, during which she had consulted other doctors, the patient returned with a complete hemiplegia of the left side, the result of a recently suffered apoplexy. During the next few years, the hemiplegic symptoms remained constant and the patient underwent treatment for her conjunctivitis. Eventually, suspected cerebral symptoms (dizziness, vomiting, psychic depression) manifested themselves, and soon thereafter the patient had a new and severe apoplexy which affected the other hemisphere. In her last week of life, she was given to nocturnal states of such violent excitation that even large doses of morphine and veronal had virtually no effect. Three days before her death, it was discovered that for 14 years the patient had been in the practice of inhaling a mixture of chloroform and ether to help her sleep. In this light, the author suggests that the delirious state of the patient's last days may be regarded as an abstinence symptom. He also considers the questions raised by the small amount of her accustomed dose, which was known never to have exceeded 20 drops, dealing with the nature of the action, and effect of the drugs involved and, in view of their prolonged use, the apparent absence of a tolerance syndrome.

98. Garrett, G., and Johnson, J.
 PLASTIC-BAG ASPHYXIA IN A GLUE-SNIFFER.
 Lancet (London), 1(7496): 954 (1 ref.), 1967.
 E - intentional - lett. ed. - solvents - humans - adoles. - male -
 intent. inhal. - depress. - pers. prob. - courts - hosp. - autop. -
 cardiovasc. syst. - resp. syst. - death B-1978.

A 19 year old boy started glue sniffing in a gang at the age of 14, and progressed to using 15-20 tubes per day by himself. He had a hysterical personality disorder, became aggressive, and indulged to relieve his depression. He resorted to nitrous oxide following psychiatric treatment and dismissal from a new job. His death from asphyxiation due to nitrous oxide or the plastic bag is reported. There were petechial hemorrhages over the pericardium and pleura, and the lungs were emphysematous. Reference is made to Winck's report of a death of a habitual glue sniffer due to benzene poisoning. The danger of using plastic bags is emphasized. It is noted that the extent of habitual glue sniffing in England is unknown.

99. Gellman, V.
 GLUE-SNIFFING AMONG WINNIPEG SCHOOL CHILDREN.
 Canadian Medical Association Journal (Toronto), 98: 411-413
 (16 ref.), 1968.
 E - intentional - gen. - gen. disc. - solvents - humans - intent. in-
 hal. - pharmacol. - depend. - euph. - hallu. - mid., upper class -
 legis. - EEG - bone mar. - cardiovasc. syst. - CNS - resp. syst.
 - anemia - death B-0717.

This report concerns the 24 adolescent 'sniffers' seen at the Win-
 nipeg Poison Centre since 1966, and includes a survey of the liter-
 ature. Inhalation of fumes from glue and nail polish remover in-
 volves 2 - 5% of Winnipeg teenagers, according to the school prin-
 cipals. Most teenagers are not economically deprived. The sol-
 vents include: toluene, xylene, benzene, acetone, and amyl ace-
 tate. Initially, they stimulate and produce euphoria, and perhaps,
 frightening hallucinations. All can produce CNS depression. EEG
 changes do occur during toluene intoxication but are completely re-
 versible. No long term physical damage to organs has been repor-
 ted. However, deaths due to suffocation, respiratory arrest, car-
 diac arrest, aplastic anemia, suicide, homicide, or fatal accidents
 while under the influence, have been reported. Also, psychic de-
 pendence can lead to personality changes and deterioration in school-
 work. Escape from anxiety, or merely seeking excitement, are
 possible motives. Education concerning the dangers is urged if
 progression to higher incidences reported elsewhere is to be pre-
 vented. Deliberate inhalation for the purpose of intoxication is a
 chargeable offence for juveniles in Manitoba, but this alone is not
 a very effective deterrent.

100. Gioscia, V.
 GLUE SNIFFING: EXPLORATORY HYPOTHESES ON THE PSY-
 CHOSOCIAL DYNAMICS OF RESPIRATORY INTRAJECTION.
 In: A Conference: Inhalation of Glue Fumes and Other Substance
Abuse Practices Among Adolescents. Denver: U. S. Department of
 Health, Education, and Welfare, 60-73 (1 ref.), 1967.
 E - intentional - report - solvents - humans - child. - toler. -
 charac. desc. - alien. - depend. - euph. - brok. home - cult. dep-
 riv. - low. class - mid., upper class - ataxia B-1979.

Personality, family, and subcultural characteristics common to
 both narcotic addicts and glue sniffers include defective or imma-
 ture super egos, broken homes, or tyrannical fathers. However,
 narcotic addicts present a different stage of pathology than sniffers,
 who tend to be younger, and go on to use alcohol, instead of drugs.
 Addicts predominate in urban ghettos. Many are Negro, Puerto

Rican, Mexican, or Spanish. Sniffers include more suburban middle class children. There is more deviance in the youth subculture today as the family gives up its functions - the school taking over the maternal and the law taking over the paternal roles. Children rebel at being dependent on the family to satisfy the demand of society to be independent. Psychoanalysts find a symbolic relation between the meaning of breath at infantile primitive levels of the psyche, primitive levels of ethnography, religious myths to do with being born; and the use of glue. There is a 'pre-oral' or 'co-oral' mechanism involved in respiratory eroticism and heterosexual and homosexual masturbatory fantasies are induced. A euphorogenic substance is inhaled in an attempt to simultaneously incorporate a life giving spirit, and abolish the fear of dying or the giving up of breath.

101. Glaser, F. B.
 INHALATION PSYCHOSIS AND RELATED STATES. A REVIEW.
 Archives of General Psychiatry (Chicago), 14(3): 315-322 (77 ref.),
 1966.
 E - intentional - gen. - review - solvents - humans - child. - adoles.
 - female - male - desc. admin. - intent. inhal. - reg. use -
 brok. home - deviant behav. - recidiv. - EEG B-1980.

The impulse to engage in deliberate inhalation of toxic substances may be very strong and may result in chronic usage. There are a variety of methods employed by inhalers including heating the materials to produce higher vapor concentrations, and distributing gasoline over the surface of a large bowl and inhaling. Visual, auditory, and tactile hallucinations as well as spatial distortions and body image distortions are associated with inhalation psychosis. The inhaler is likely to be between the ages of 11 and 15, more frequently male than female. Most inhalers come from broken homes and, like juvenile alcoholics, engage in antisocial activities. A survey showed that there was no significant difference in intelligence between glue sniffers and normals. No single factor is necessary and sufficient to result in inhalation psychosis although the sense of smell has been pointed out by many authors as a factor of prime importance.

102. Glaser, F. B.
 SHAZAM, OR, THE MEDICAL MANAGEMENT OF COMPLICATIONS OF NON-OPIATE DRUG ABUSE.
 Pennsylvania Medicine (Harrisburg), 74(7): 52-58 (6 ref.), 1971.
 E - intentional - gen. - gen. disc. - gas. - solvents - humans - intent.
 inhal. - cardiovasc. syst. - card. arrhy. - death B-2063.

The author discusses the medical complications that might arise in treating patients who abuse drugs. They are due to the lack of a detailed and comprehensive history of the ailment through the reluctance of the patient to tell the truth and/or his ignorance as to what he has actually taken and to the purity of the drug. The taking of several drugs in combination also adds to the difficulties. The author discusses the management of various kinds of drug problems under the headings "Specific Treatment Problems", "Barbiturates and Other Sedatives", "Amphetamines and Other Stimulants", "LSD and Other Hallucinogenic Drugs", "Volatile Solvents", "Marihuana and Other Cannabis Derivatives", "Flashbacks", and "Long Term Management of Drug Abuse". The author feels that the family physician will not be of much benefit to patients who inhale organic solvent vapors as their effects are short-lived and they will be recovered from the effects or dead quite quickly. Past deaths were thought to be from suffocation from the use of plastic bags, however sudden death may be caused by a cardiac arrhythmia.

103. Glaser, H. H. , and Massengale, O. N.
 GLUE-SNIFFING IN CHILDREN. DELIBERATE INHALATION OF
 VAPORIZED PLASTIC CEMENTS.
 Journal of the American Medical Association (Chicago), 181: 300-
 303 (6 ref.), 1962.
 E - intentional - gen. - case hist. - solvents - humans - child. -
 adoles. - female - male - desc. admin. - intent. inhal. - reg. use
 - toler. - depend. - disorient. - exhil. - euph. - impair. - deviant
 behav. - low. class - juven. - hosp. - blood test - EEG - urin.
 test - bone mar. - cardiovasc. syst. - CNS - kid. , liv. - nerv.
 syst. - resp. syst. - ataxia - death - nausea - tinnitus - urin. path.
 - vomit. A-0074.

In 2 years, 124 boys and 6 girls, ages 7 - 17, have been arrested for glue sniffing in the Denver area. Previously, it was almost unknown. Symptoms vary from mild euphoria to gross disorientation and coma after prolonged inhalation. Tolerance develops. Initially, a few whiffs produce a 'jag', then 5 or more tubes (21 cc.) are required. Physiological addiction is unknown but psychological dependency is common. Fumes are potentially dangerous to liver, kidney, brain, and bone marrow. However, no serious organic damage has been reported. Volatile solvents including aromatic hydrocarbons, halogenated hydrocarbons, ketones, esters, alcohols, and glycol are listed. Benzene, toluene, and xylene produce increased weight of the spleen and kidneys, and degeneration of seminiferous tubules of testes in inhalation experiments on rats, rabbits, and guinea pigs. Benzene was the most toxic, producing leucopenia. The practice is symptomatic of social illness and is

closely associated with other forms of juvenile asocial behavior. Progression to alcoholism, drug addiction, and criminal activity is likely. Case histories of 6 boys illustrate the common features of broken homes, low incomes, and high proportion of Spanish Americans.

104. Glatzel, J.

ÜBER EINE BEOBACHTUNG VON TRICHLORÄTHYLEN-SUCHT.
[On a case of trichloroethylene addiction].

Psychiatrie, Neurologie und Medizinische Psychologie (Leipzig),
19: 366-371 (30 ref.)

1967.

G - intentional - gen. - case hist. - review - solvents - humans -
adoles. - male - intent. inhal. - reg. use - alien. - depend. -
disorient. - euph. - hallu. - impair. - brok. home - peers - psych.
test - ataxia

B-1981.

After a short review of the related literature, the author presents a case of an 18 year old apprentice mechanic who was brought to the clinic in an unconscious state. After approximately 12 hours, he regained consciousness and physical and psychopathological tests were begun. The patient was exceptionally restless, unsteady, and disoriented and his powers of attention were clearly impaired. His background showed that he came from a broken home and had left school at the age of 14, at which time he had begun consorting with a group of youths who regularly inhaled trichloroethylene. The patient later took to sniffing alone as well as with the others as it was his only escape from the monotony and boredom of his daily life. He described the nature of the intoxication and compared it with that experienced under hashish and marihuana. Although the latter produced a more intense hallucinatory effect, his preference remained with "Tri" since under its influence he had always remained aware of the external situation and after it, unlike alcohol, he felt light and relaxed. Apart from some fatigue and a slowness of reactions, it had no ill after-effects unless he took an overdose, nor had he known any withdrawal symptoms following a sudden suspension of use after months of daily intake. Details of the Hamburg-Wechsler-Intelligence and Rorschach test results are given and the author concludes with a casuistic discussion emphasising the questions of addictions, the nature of the intoxication experience, and the external circumstances of the trichloroethylene abuse in the present case.

105. Gold, N.

SELF-INTOXICATION BY PETROL VAPOUR INHALATION.

Medical Journal of Australia (Sydney), 2: 582-583 (8 ref.),

1963.

E - intentional - gen. - case hist. - gas. - humans - adoles. -

male - intent. inhal. - reg. use - hallu. - impair. - brok. home -
cult. depriv. - recidiv. - psych. test - kid., liv. - resp. syst. -
ataxia - death - dizz. - headache - nausea - tinnitus - urin. path.

A-1608.

Intoxication by petrol vapors usually occurs outside the now well supervised petroleum industry. Symptoms occur at one part per thousand in air and resemble alcohol intoxication. Delirium with bouts of mania and visual hallucinations have been reported and intoxication has been mistaken for schizophrenia. References to cases of deliberate intoxication by children and adults are given as there is no mention in standard texts of psychiatry. Poor prognosis is indicated, but follow-ups have been short. Repeated exposure may induce: epileptic seizures, unconsciousness and death, edema of the brain, changes in the myelin, and liver and kidney damage. As no withdrawal symptoms are noted, it fits the W. H. O. definition of habituation rather than addiction. All sniffers have come from broken homes, and most are boys. A new clinical record is presented of a 14 year old boy, insecure in a foster home following many placements. He had sniffed gasoline repeatedly for a year when he needed to 'get pleasant feelings'. He could not stop, in spite of promises, and fear of unconsciousness; he did for awhile but resumed when under stress of school examinations.

106. Gonzalez, E. G., and Downey, J. A.

POLYNEUROPATHY IN A GLUE SNIFFER.

Archives of Physical Medicine and Rehabilitation (Chicago), 53(7):
333-337 (13 ref.), 1972.

E - intentional - gen. - case hist. - solvents - humans - adoles. -
male - intent. inhal. - reg. use - charac. desc. - pers. prob. -
exhil. - euph. - hallu. - impair. - hosp. - biopsy - blood test -
psych. test - urin. test - nerv. syst. - weak. B-2064.

A case report including all laboratory results is presented of a 20 year old man who had sniffed the solvent n-hexane sparingly for about 11 months followed by 4 months of nightly inhalations. Although he had stopped sniffing a month before admission to hospital, he was suffering from a severe form of polyneuropathy. The author reviews the literature on the neurotoxic property of this solvent and feels that it is this property which distinguishes n-hexane from other common solvents. The progression of symptoms of weakness and sensory impairment due to the effect of n-hexane on the peripheral nerves, even after stopping exposure, is a major characteristic of the solvent.

107. Grabski, D. A.

TOLUENE SNIFFING PRODUCING CEREBELLAR DEGENERATION.

American Journal of Psychiatry (Baltimore), 118: 461-462 (3 ref.),
1961.

E - intentional - gen. - case hist. - solvents - humans - adults -
male - intent. inhal. - reg. use - toxicol. - pers. prob. - euph. -
hosp. - kid., liv. - dizz. - tremors A-1609.

Toluene can produce irreversible cerebellar degeneration along with other toxic effects. One male, hospitalized at the age of 21 and 3 times since, laughed inappropriately and threatened suicide. This case illustrates the hazards of contact with industrial solvents and provided some neurological findings. Toluene is inhaled in high concentration from soaked cloths. Psychological testing results were more compatible with schizophrenia than organic brain disease. Diagnosis indicated primary personality disorder, with secondary symptoms due to toluene inhalation. As cerebellar signs may be overlooked (tremors being attributed to nervousness), psychiatrists are warned to consider attributing the pathology to toluene, and compelling cessation of its inhalation when appropriate.

108. Granier-Doyeux, M.

UN NUEVO TIPO DE DELINCUENTES JUVENILES. LOS
"INHALADORES DE PEGA". [A new type of juvenile delinquents.
The "inhalers of varnish"].

Policia Cientifica (Caracas), 1(1): 25-30 (11 ref.), 1963.
Sp - intentional - gen. - res. pap. - gen. disc. - review - solvents
- humans - mammals - child. - adoles. - female - male - desc.
admin. - intent. inhal. - exper. inhal. - reg. use - toler. - pers.
prob. - depend. - exhil. - euph. - impair. - cult. depriv. - peers
- low. class - juven. - ataxia - nausea - tinnitus A-1610.

The author discusses solvent sniffing under the headings of substances used, composition of substances used; socio-economic factors, race, age, and sex of the users; and associated crimes. The determining causes of abuse, methods of use, along with the immediate and secondary effects of inhalation are outlined. Results of the author's animal research plus a discussion dealing with the social problem involved, completes the article. The major characteristics of these new juvenile delinquents are presented through a review of past literature. The majority of sniffers come from the lower socio-economic class and often have emotional disorders. This practice can lead to other acts of delinquency and even develop into a real addiction.

109. Grant, W. B.
 INHALATION OF GASOLINE FUMES BY A CHILD.
 Psychiatric Quarterly (Utica), 36(3): 555-557 (0 ref.), 1962.
 E - intentional - gen. - case hist. - gas. - humans - child. - male
 - intent. inhal. - reg. use - hallu. A-1611.

This report of an 11 year old boy who received satisfaction (previously, by eating erasers) from inhaling gasoline fumes, is in response to the small number of such reports in the literature. He had visual and auditory hallucinations. He was intelligent and reasonably satisfied with his home life. Details are sketchy and a follow up was not possible. The author speculates on the sexual significance of feeling 'like a spring' in bending over and rising from the petrol can. The mother's ambivalence toward the boy is suspected. Need for later psychiatric treatment is predicted.

110. Guaraldi, G. P., and Bonasegla, F.
 SU DI UN CASO DI TOSSICOMANIA DA TRICHLOROETILENE.
 [On a case of trichloroethylene addiction].
 Rivista Sperimentale di Freniatria e Medicina Legale delle Alienazioni Mentali (Reggio-Emilia), 92: 913-920 (10 ref.), 1968.
 I - intentional - gen. - case hist. - solvents - humans - adoles. - female - intent. inhal. - reg. use - toler. - charac. desc. - pers. prob. - euph. - hallu. - impair. - hosp. - blood test - urin. test
 B-1982.

The case of a 16 year old girl is reported who first started inhaling trichloroethylene sparingly at the age of 10 years and who was addicted to the solvent by the time of her admission to the clinic. At that time, she was subject to periods of semi-consciousness and even deep unconsciousness. Her psychological profile showed infantile tendencies, average intelligence, inhibitions, and signs of hypochondria. The author reviews the tests performed on the patient and summarizes the probable reasons for her turning to trichloroethylene for an escape from reality. These were her abnormal body functions, figure, and her interpersonal relationships. The effects which she experienced while sniffing are related and entailed mystical fantasies and euphoria.

111. Hanson, R. C.
 EXPLAINING GLUE SNIFFING AND RELATED JUVENILE DELINQUENCY.
 In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 82-95 (16 ref.), 1967.
 E - intentional - report - solvents - humans - child. - adoles. -

female - intent. inhal. - reg. use - cult. depriv. - peers - low.
class

B-1983.

In an attempt to discover the causal factors for glue sniffing, 36 male Spanish American glue sniffers in the Denver Juvenile Court project were compared with 64 8th grade, middle-class non-sniffers. Socializing institutions are primarily the family and the school. Absence of normal male models and affection at home lead to anxiety and insecurity. Disorganized families prevent children from acquiring attitudes and norms accepted by the rest of society and lead to personality defects. Those from lower-class urban Spanish American groups adapted poorly to the competition and the ambitions expected of middle-class children at school. They felt frustration and failure. Companionship and status were finally sought with peers from similar backgrounds. This led to glue sniffing and delinquency. They had seen much deviant behavior in the home and neighbourhood, such as excessive drinking, sexual promiscuity, truancy, and delinquency. The most powerful variables correlating with glue sniffing included: truancy, poor grades, family disorganization, lack of social dominance, little ego strength, and negative attitudes towards the school and the law.

112. Heuser, M.

TOLUOLSUCHT. [Toluene addiction].

Medizinische Klinik (Berlin), 63: 1888-1890 (10 ref.), 1968.

G - intentional - gen. - case hist. - solvents - humans - adults -
male - intent. inhal. - reg. use - pers. prob. - euph. - hallu. -
impair. - hosp. - biopsy - blood test - urin. test - bone mar. -
kid., liv. - nerv. syst. - tremors

B-2080.

A case is presented of a printer's assistant who was addicted to industrial toluene and admitted to hospital. The psychological aspects and the laboratory findings are presented. Symptoms included toxic polyneuropathy, hepatic pathology, bone marrow damage, delirium tremens, and those of depressive withdrawal. The legal precautions involved in the use of industrial solvents are deficient in that, while the author agrees that solvents are habit forming, he feels that the technical precautions taken and the routine medical examination involved are inadequate. What is more important than these precautions are the psychiatric contributions which must be made for an effective program of industrial hygiene. In conclusion, the potential dangers of solvents are noted and the suggestion that toluene addiction is a prototype of glue sniffing is made.

113. Heveroch
 PROF. HEVEROCH DEMONSTRUJE PŘÍPAD ETHEROMANIE.
 [Prof. Heveroch discusses a case of ether addiction].
 Casopis Lékařů Českýcy (Prague), 59: 464 (0 ref.), 1920.
 C - intentional - gen. - case hist. - anesth. - humans - adults -
 male - intent. inhal. - reg. use - impair. A-1613.

A 38 year old copper worker sniffed ether for five years. His first contact with it occurred when it was used as an anesthetic during an operation on his hand which had been injured in an accident. After the operation, he began to use it on his own for the relief of recurring pains. He would inhale 100 - 150 g. daily to the point of narcosis. The period of intoxication lasted 3 - 4 hours. He gave up his job and became a veritable beggar, earning little more than was necessary for his ether habit. Before the operation, his alcohol consumption was slight; after it, he ate less and drank 2 - 3 glasses of beer a day. At times, when he abstained from ether, he felt unwell and slept poorly. Because of its sweet smell, the patient preferred ether to chloroform. The author observes that neurastheniacs have a tendency to degenerate into etheromania, morphinism, cocaineism, chloralism, etc.

114. Hryniewicz, L.
 PRZYPAD NARKOMANII TRÓJCHLOROETYLENOWEJ
 POWIKŁANEJ OBJAWAMI PSYCHOTYCZNYMI [A case of tri-
 chloroethylene addiction with mental complications].
 Neurologia, Neurochirurgia i Psychiatria Polska (Warsaw), 13(6):
 941-943 (7 ref.), 1963.
 Po - intentional - gen. case hist. - solvents - humans - adoles. -
 female - intent. inhal. - reg. use - depend. - euph. - hallu. - trans.
 prob. - hosp. - EEG - psych. test - headache - nausea A-1614.

After a brief review of related literature, the author reports of a case of an 18 year old laboratory technician who became addicted to trichloroethylene while performing her duties in an industrial experimental laboratory. Her first experience with 'tri' occurred when the intense smell of the solvent caused her to choke, leaving her in a state of intoxication (nausea, fatigue, headaches) for several days. The patient gradually began to find the smell more pleasant and admits that she began to inhale it consciously because of the euphoric and pleasant state of drunkenness it produced. Consequently, the patient lost interest in friends, and plunged into a life of inactivity and solitude. In a few weeks, complete narcomania was evident in the patient, the compulsion to inhale 'tri' being her sole obsession. Psychotic troubles (paranoia, hallucinations) also

became apparent, and in the first few days at the psychiatric clinic, these symptoms led to suspicions of schizophrenia. After being released from the clinic upon her parents' orders, the patient resumed a normal and active life until she returned to work and came in contact with 'tri' once again. Narcomania returned along with the same psychotic symptoms as before. However, the patient was completely cured due to her co-operation and understanding of her own predicament. Results of neurological and EEG tests performed on the patient are given. Psychological tests did not reveal any mental debility or signs of psychopathy. The author attributes her addiction to the abundance of 'tri' in her working environment.

115. Ikeda, M., Ohtsuji, H., Kawai, H., and Kuniyoshi, M.
EXCRETION KINETICS OF URINARY METABOLITES IN A PATIENT ADDICTED TO TRICHLOROETHYLENE.
British Journal of Industrial Medicine (London), 28(2): 203-206
(14 ref.), 1971.
E - intentional - experimental - res. pap. - case hist. - solvents - humans - adults - male - intent. inhal. - reg. use - metabolism - disorient. - hallu. - trans. prob. - hosp. - urin. test - tremors
B-1984.

A 38 year old Japanese male worked for 11 years washing metal parts in trichloroethylene (TCE). For the past 6 - 8 years, he had become addicted to sniffing the solution from a soaked cloth up to three times a day whenever he felt tired or had trouble sleeping. Examination at the psychiatric clinic revealed disorientation, visual hallucinations, and persecution delusions. Diagnosis was: exogenous psychosis possibly due to 'TCE' addiction. He recovered in one month. Liver function tests were normal. Metabolic studies showed an initial fast fall of excretion immediately after inhalation of 'TCE', and a decrease five days after discontinuation of sniffing. Analyses of urine revealed up to 160 μ g/ml. of trichloro-compounds (mostly trichloroacetic acid) which gradually disappeared in 3 weeks as the psychotic symptoms cleared up. This is a noteworthy correlation, although there is no positive finding indicating that 'TCE' or its metabolites for the initial rapid phase (slow phase in parentheses) were 5.8 (49.7) hours for trichloroethanol; 22.5 (72.6) hours for trichloroacetic acid; and 7.5 (72.6) hours for the total trichloro-compounds.

116. Jackson, R., Thornhill, E., and Gonzalez, R.
'GLUE SNIFFING - BRIEF FLIGHT FROM REALITY.'
Journal of the Louisiana Medical Society (New Orleans), 119(11): 451-454 (12 ref.), 1967.

E - intentional - gen. - gen. disc. - solvents - humans - child. - adoles. - male - intent. inhal. - reg. use - toler. - pers. prob. - hallu. - trans. prob. - brok. home - low. class - hosp. - EEG - psych. test - urin. test - dizz. - nausea - tinnitus - vomit. B-1985.

Due to the disparity in reports on the effects of glue sniffing, case reports of nine boys ages 8 - 15 years, 5 Negro and 4 White, admitted to the adolescent unit of a state psychiatric hospital are given. Some also sniffed gasoline, smoked tobacco, took alcohol or pep pills, and stole. None used narcotics. All were from broken homes in middle and low income groups. Three had borderline low I. Q. s. A table lists side effects including hallucinations, dizziness, tinnitus, nausea, and depression. Physical and neurological examinations were normal in all. There was a diffuse nonspecific slowing in the EEG in three of the boys. Diagnoses were: 5 - personality disorders; 2 - schizophrenic; and 2 - adjustment reactions. Laboratory tests did not reveal organic defects as in reports of industrial exposures. Glue sniffing is not a new threat but another symptom of an old disease - emotional and social deprivation of children, and should be dealt with accordingly. Publicity and legislation are ineffective.

117. Jacobziner, H., and Raybin, H. W.

GLUE SNIFFING.

New York State Journal of Medicine (New York), 62: 3294-3296
(0 ref.), 1962.

E - intentional - gen. - case hist. - gen. disc. - solvents - humans - child. - adoles. - female - male - intent. inhal. - reg. use - impair. - hosp. - blood test - urin. test - bone mar. - CNS - kid., liv. - dizz. - nausea - vomit. A-1615.

A few of the 15 cases of glue sniffing reported to the New York Poison Control Centre between Jan. - May 1962, are outlined. There were 10 boys and 5 girls ages from 9 - 18 years. No serious toxicity is reported, but the extent and control of the problem is discussed. Many persons present no symptoms, but a few show nausea, vomiting, and diarrhea. Some report CNS depression or excitement and may go into a stupor. Delirium and unconsciousness may develop. Damage to the hematopoietic system, kidneys, and liver is possible. Treatment is symptomatic; then, referral to a psychiatrist is advised to treat any emotional disturbance or personality disorder behind this chronic need for kicks. It is not the specific addiction, but what causes it, that is critical; as the same personality defects and needs predispose addiction to alcohol or other drugs. Glue sniffing is part of an overall family and community health problem. Publicity about hazards has encouraged

rather than discouraged the habit. Constituents of various plastic cements and some lethal concentrations are listed.

118. Jacobziner, H., and Raybin, H. W.

GLUE SNIFFING.

New York State Journal of Medicine (New York), 62(3): 2415-2418

(1 ref.),

1963.

E - intentional - gen. - gen. disc. - solvents - humans - child. -
adoles. - female - male - intent. inhal. - reg. use - exhil. - impair.
- legis. - CNS - dizz. - nausea - vomit. A-1616.

Cases of glue sniffing reported to the New York Poison Control Center by the Board of Education and the police are analyzed. Medical symptoms other than temporary ones, are conspicuous by their absence. However, dizziness, stupor, unconsciousness, and vomiting occurred in some, especially if alcohol was taken before inhalation. Of the 443 cases reported between Jan. - Mar. 1963, only 22 were female. The total incidence varied according to the borough, but this may be due to the lack of reporting. Some States prohibit inhalation by minors. New York is proposing to prohibit sales, and attempting to persuade the industry to find safer solvents. However, education of physicians, adolescents, teachers, and the community is the best weapon. Glue sniffing, like alcoholism, gasoline inhalation, or drug addiction is symptomatic of an emotional disturbance. To resort to the police is no answer. Educational opportunities in mental hygiene may be the most fruitful.

119. Jacobziner, H., and Raybin, H. W.

LEAD POISONING AND GLUE SNIFFING INTOXICATIONS.

New York State Journal of Medicine (New York), 63: 2846-2848

(0 ref.),

1963.

E - intentional - report - solvents - humans - child. - female -
male - intent. inhal. - reg. use - impair. - cult. depriv. - peers -
hosp. - kid., liv. A-1617.

This first report of a case of suspected medical injury (hepatitis) due to glue sniffing concerns a 7 year old boy who had indulged for a month. There were no other such findings in over 100 cases reported to the New York Poison Control Center. The actual cause of the hepatitis is not proved. He was discharged with slight icteric jaundice. A 12 year old female is described as becoming semi-comatose; the state most frequently seen in glue sniffers. A case of accidental ingestion of norethynodrel, and one death from lead encephalopathy after eating wall paint, are reported.

120. Jacobziner, H. , and Raybin, H. W.
 YEAR-END REPORT ON ACTIVITIES OF THE NEW YORK CITY
 POISON CONTROL CENTER.
 New York State Journal of Medicine (New York), 63: 444-450
 (26 ref.), 1963.
 E - intentional - report - solvents - humans - child. - intent. inhal.
 - reg. use - exhil. A-1618.

Two paragraphs on glue sniffing indicate that more cases are being reported by family court, teachers, and nurses than the year before. Health hazards are minimal except for the depressive and exhilarative effects. First aid should be given, then referral to a psychiatrist. Besides this information, eight case reports of various accidental poisonings are given and titles of 16 lectures and 27 articles published from the Center are listed. 112 fatalities in 15,571 incidents (all ages) were reported between Jan. - Oct. 1962. Barbiturates and narcotics were the leading causes. Tables provide details. Lead poisoning and thalidamide poisoning are discussed.

121. James, W. R. L.
 FATAL ADDICTION TO TRICHLOROETHYLENE.
 British Journal of Industrial Medicine (London), 20: 47-49 (19 ref.),
 1963.
 E - intentional - gen. - case hist. - solvents - humans - adults -
 male - intent. inhal. - reg. use - impair. - courts - blood test -
 urin. test - kid. , liv. - resp. syst. - ataxia - death - vomit.
 A-1619.

A man took prohibited risks between the years 1948 - 1957, in entering vats with vapors from hot trichloroethylene used in degreasing metal. He often bent over full vats unnecessarily. He showed more effects from the fumes than the other workers. He lost his sense of smell, became nauseous, and drowsy. His death was sudden at the age of 31 - 17 hours after his latest exposure. Detailed autopsy findings showed lung and liver, but no myocardial, brain, or kidney damage. References are cited to differences of opinion about the effects on the liver. Trichloroethylene, 2.25 mg./100 ml. blood, and 55.5 mg. trichloroacetic acid (to which it is partly converted) were found per 100 ml. of urine. Blood levels of 5 - 10 mg./100 ml. cause anesthesia but normally, it is rapidly excreted by the processes involving the liver, lungs, and kidney; reaching a maximum in the urine at 24 hours. No psychological causes or effects of the apparent addiction are given, but it is noted as an industrial hazard. The employers were compelled to pay some compensation for not recognizing the addiction.

122. Joël, E.
AETHERSUCHT. [Ether addiction].
Deutsche Medizinische Wochenschrift (Stuttgart), 54: 1081-1083
(0 ref.), 1928.
G - intentional - gen. - case hist. - anesth. - humans - adults -
male - intent. inhal. - reg. use - anx. - depress. - depend. - euph.
- hallu. - impair. A-1620.

The author reports on two of four observed cases of ether addiction. The first is that of a 43 year old druggist who undertook self-experimentation with ether in order to find out "what narcosis is like". From his background, it was learned that his father had been an alcoholic, and he himself, had formerly drunk heavily. Comical and religious images dominated his ether hallucinations, and he attributed the latter to his strong Catholic upbringing. The pleasure of the sensations that ether gave him was one motive for his abuse of it; otherwise he admitted to indulging in it out of anger, particularly, after domestic disagreements. He also tried other substances, such as benzine, chloroform, sulphuric acid, hydrochloric acid, and chromic hydracid(?), but none of these proved as enjoyable as ether. The second case was that of a 25 year old South American medical student who turned to ether after an abortive romance. His practice was to wander along the streets, his face buried in a handkerchief soaked with drug-store ether. He had been consuming 50 - 100 g. daily for months. Whenever he abstained, his sleep was affected, he perspired heavily, but he ate and smoked more than usual. His behavior had become compulsive and erratic. He agreed to act as the subject of an experiment conducted in the clinic, during which he administered to himself 100 g. of pure ether. The observations of this test are detailed. In summation, the author discusses and compares the four cases he has studied on the basis of the users' professions, preference for vaporous intoxicants, and their physical symptoms of addiction.

123. Johnson, K. G. , Donnelly, J. H. , Scheble, R. , Wine, R. L. , and Weitman, M.
SURVEY OF ADOLESCENT DRUG USE. I - SEX AND GRADE DISTRIBUTION.
American Journal of Public Health (New York), 61: 2418-2432
(8 ref.), 1971.
E - intentional - experimental - res. pap. - solvents - humans -
child. - adoles. - male - intent. inhal. - reg. use B-2065.

A survey dealing with the following drugs: marijuana, amphetamines, inhalants, sedatives and tranquilizers, cocaine, hallucinogens, narcotics, barbiturates, alcohol, tobacco, headache reme-

dies, cold remedies, and antihistamines was undertaken in 1968. The 2,752 subjects were high school students who represented less than 10 percent of the total high school population attending the four grade levels. The results revealed that more boys than girls reported using illicit drugs and that there was reported association between increased drug use and increased age, except for the senior girls in the sample. In regards to inhalants, their use declines with increasing age. This trend is consistent with other reports that sniffing inhalants is a practice of the 10 to 14 year old boys and dis-
dained by older adolescents.

124. Jordi, A.

MISSBRAUCH VON TRICHLORAETHYLEN DURCH JUGENDLICHE ZUR HYPNOSE. TRI-SUCHT BEI EINEM SEKUNDARSCHÜLER. BEITRAG ZUR KENNTNIS DER GIFTWIRKUNG. [Abuse of tri-chloroethylene by adolescents for hypnosis. Tri-addiction in a secondary school pupil. Contribution to the information on the toxic effect].

Schweizerische Medizinische Wochenschrift (Basel), 67(52): 1238-1240 (15 ref.), 1937.

G - intentional - gen. - case hist. - recom. - solvents - humans - adoles. - male - intent. inhal. - occas. use - reg. use - toxicol. - impair. - peers A-1621.

A young apprentice mechanic with an interest in hypnosis decided to use some suitable drug to help him induce a trance in his subjects. Ether and chloroform were tried and rejected as unsatisfactory. One day, while working with trichloroethylene at the factory, he noticed its soporific, intoxicating effect. To mask its unpleasant odour, he combined it with "Duco-thinner", whose known ingredients are amyl alcohol, butyl alcohol, amyl and butyl acetate, toluol, and benzol. With this mixture (usually 2/3 to 3/4 'Tri', the rest thinner) he succeeded in more easily hypnotizing the resistant subjects. It is estimated that the amount of fluid each consumed through inhalation was one cc. or more. Most of the people evidently became sleepy, but if hypnosis failed, they became infected by unrestrained gaiety and high spirits. In the case of one alcoholic teenager, an intense state of excitement was accompanied by pronounced motor unrest. When later questioned, the experimenter admitted that approximately 50 persons, mostly teenagers, acted as subjects and many wanted to try the secret liquid again, but each one was only given it once. A friend, who had shared his interest in these experiments decided to engage in some of his own. This led to the introduction of the substance to his brother, a secondary school pupil. This 15 year old brother, in

whom the preconditions for an addiction were present, began to inhale the mixture regularly, and consequently, his school work suffered greatly and he became increasingly unruly. He had to be sent to a boys' home. The author devotes the rest of this paper to a discussion, in light of this case and previous literature, of the toxicology of trichloroethylene, the possibility of addiction to it, and the dangers of its free availability.

125. Karani, V.

PERIPHERAL NEURITIS AFTER ADDICTION TO PETROL.

British Medical Journal (London), 1(5481): 216 (17 ref.), 1966.

E - intentional - gen. - case hist. - gas. - humans - adults - male
- intent. inhal. - reg. use - hosp. - biopsy - blood test - CNS -
nerv. syst. - weak. B-1986.

A case of a 20 year old male who developed chronic dermatomyositis after addiction to swallowing and/or inhaling petrol containing triorthocresyl phosphate, is reported. His introduction to the habit was after accidental ingestion at the age of 17. The compound has not been incriminated before in chronic petrol poisoning. Details of symptoms, and references to other reports on triorthocresyl phosphate toxicity, on accidental petrol poisoning, and on rare self-induced petrol poisonings are given. He was hospitalized for 5 weeks, given physiotherapy, corticosteroids, vitamin B₁ and B complex, and cured in 8 months. There was no relapse in two years. He found that the first week of withdrawal was quite difficult.

126. Karlsson, B.

THINNER-, ALKOHOL- OCH TABLETTMISSBRUK BLAND BARN OCH UNGDOM. TOXIKOLOGISKA SYNPUNKTER. [Thinner, alcohol, and drug addiction in children and adolescents. Toxicological aspects].

Nordisk Medicin (Helsinki), 70(32): 893-896 (9 ref.), 1963.

S - intentional - gen. - gen. disc. - solvents - humans - child. -
adoles. - intent. inhal. - reg. use - toxicol. - impair. A-1622.

The addiction to alcohol, thinner, and drugs by youth is discussed. There are no peculiarities in young people who are alcoholics which makes them any different from other alcoholics. While thinner intoxication resembles alcohol intoxication, the toxicity of this practice is not fully clear and is consistently changing as many different solvents can be inhaled. Drug addiction mostly involves stimulant drugs whose toxicity is of a less serious nature. However, abuse of morphine and morphine-like drugs is of very serious concern.

127. Kashima, T. , Fukui, M. , Masuda, Y. , Wakasugi, C. , and Hayama, R.
 [REPORT OF FIVE CASES; WHERE ORDINARY VINYL BAG WAS USED FOR SUICIDAL PURPOSE. (SUFFOCATION, CO-POISONING AND "THINNER"-POISONING)].
 Japanese Journal of Legal Medicine (Tokyo), 23(3): 248-252 (7 ref.),
 1969.
 J - intentional - gen. - case hist. - solvents - humans - intent. inhal. - death B-1987.

Five cases are described in which the victims were found dead with vinyl bags over their heads. Asphyxia, CO - poisoning, and thinner poisoning were the causes of death. It was apparent that at least two of the victims looked for relief by inhaling the solvent vapors.

128. Keeler, M. H. , and Reifler, C. B.
 THE OCCURRENCE OF GLUE SNIFFING ON A UNIVERSITY CAMPUS.
 Journal of the American College Health Association (Ithaca), 16(1): 69-70 (2 ref.),
 1967.
 E - intentional - gen. - case hist. - solvents - humans - adoles. - male - intent. inhal. - reg. use - depress. - disorient. - euph. - hallu. - blood test - urin. test - bone mar. - cardiovasc. syst. - CNS - ataxia - dizz. - tinnitus - urin. path. B-1988.

Feelings induced by the inhalation of glue vapors by two 18 year old male university students are described. They preferred it to alcohol. The effects were produced, and dissipated, more quickly. They chose the toluene base glues and were afraid to try LSD. They experienced euphoria and "pleasant dizziness" and tinnitus at first, and then had slurred speech, ataxia, disorientation, a dreamlike state, and sometimes hallucinations by increasing the dosage. No evidence of organic brain damage, schizophrenia, or affective disorder was found. One was an introvert, and indulged when depressed while the other was an extrovert doing it for kicks. Other intoxicating solvents are listed. Toluene vapors irritate the mucous membranes and it is a CNS depressant. It can produce anorexia, muscle weakness, and ataxia. A major hazard is its contamination by benzene which damages hemopoietic tissue, and may be fatal. Pathological effects of acetone inhalation are described. There are no reported cases of permanent brain damage secondary to glue sniffing nor irreversible kidney damage, though this, and aplastic anemia secondary to benzene intoxication, may occur.

129. Keyserlingk, H. , von
DIE ÄTHERSUCHT. [Ether addiction].
Nervenarzt (Berlin), 18(10): 450-453 (22 ref.), 1947.
G - intentional - gen. - case hist. - review - anesth. - humans -
adults - female - intent. inhal. - reg. use - depend. - impair. -
hosp. - psych. test - vomit. A-1623.

In addition to a review of previous contributions to the question of ether abuse, the author presents two case histories from his personal observation. A 34 year old woman underwent clinical treatment over a period of 8 years. Before her first visit, she was in a state of almost constant intoxication due to the daily inhalation of as much as one liter of ether. Her first bottle was purchased 14 years previous, for relief of headaches. After 4 weeks, she was released from the clinic but was readmitted two months later because of frequent epileptic fits. At this time, she was consuming 50 g. of ether daily. The attacks ceased after the first 4 months of treatment. The next year, she spent additional months in the clinic and a sanatorium, but relapses always followed her release. She suffered an increase of epileptic fits, states of semiconsciousness, and pori-omanic periods. The internal and neurological findings of all examinations were negative. Addiction extended over a period of 20 years and it is assumed that the first occurrence of the fits was simultaneous to its inception. The author does not believe, however, that this signals a case of ether epilepsy along the lines of alcohol epilepsy, but rather that a genuine epilepsy was complicated by etherism. The second patient was a 26 year old man who, on the advice of a friend, took ether because he had difficulty sleeping. Its continued use caused him to be afflicted with states of semi-consciousness lasting as long as an entire day with subsequent amnesia and, lastly, vomiting. Internal findings were insignificant and the results of the neurological tests were interesting and given in detail.

130. Kihlbom, M. , and Takman, J.
THINNERSNIFFNING OCH THINNERSNIFFARE. [Thinner sniffers and thinner sniffing].
Läkartidningen (Stockholm), 60: 1565-1573 (17 ref.), 1963.
S - intentional - gen. - gen. disc. - solvents - humans - adoles. -
intent. inhal. - reg. use - toxicol. - cult. depriv. - deviant behav.
- tremors A-1624.

The most common ingredients of thinner are tabulated and their respective toxic effects are discussed. An investigation of 57 thinner sniffing teenagers in Stockholm is described. The sample included habitual, severe cases of sniffing where other forms of deviant behavior were also present. The sniffers were studied with

regard to their family histories and their use of other substances such as alcohol and narcotics. Out of 21 subjects, eleven reported abstinence symptoms such as insomnia and tremors. The fact that these symptoms were not found to correlate with the duration or frequency of sniffing is of special interest.

131. Knabenhans, P. J.
 ÜBER PSYCHISCHE SYMPTOME BEI VERGIFTUNGEN MIT
 MODERNEN GEWERBLICHEN LÖSUNGSMITTELN. [On psychic
 symptoms from poisoning with modern industrial solvents].
 Schweizer Archiv für Neurologie und Psychiatrie (Zurich), 48:
 232-271; 49: 128-164 (455 ref.), 1941.
 G - intentional - gen. - case hist. - review - solvents - humans -
 accid. inhal. - intent. inhal. - acute dos. - chron. dos. - reg. use
 - toxicol. - impair. A-1625.

An attempt is made to summarize the psychic symptomatology of solvent poisonings following a discussion of their individual aspects. After a short discussion of the toxicological questions, a general picture for every group of toxic agents is briefly worked out, supported by numerous references to literature, plus 2 of the author's own unpublished case histories (one of which is the detailed account of a 37 year old worker who became addicted to trichloroethylene), and 40 cases from the observations of the Swiss Accident Insurance Institute (Suva). Emphasis is placed on the psychic symptoms rather than the attending physical symptoms. The great mass of material necessitates no more than a key-word account of the content of previous works, whereas a closer report is given of the author's own 2 cases and those supplied by 'Suva'. For every toxic agent, a description of the acute and chronic forms of poisoning is compiled. The paper is divided into a General Part, and a Special Part organized under the following headings: hydrocarbons, chlorinated hydrocarbons, alcohols, esters, ketones, ethers, other solvents, and related organic substances. At the end of this section, the common symptoms of all the toxic agents are discussed, following the order of: acute poisonings, after-effects from acute poisonings, chronic poisonings, and attending symptoms of chronic poisonings. It is concluded that addiction occurs with those solvents which have an acute intoxicative effect.

132. Knox, J. W., and Nelson, J. R.
 PERMANENT ENCEPHALOPATHY FROM TOLUENE INHALATION.
 New England Journal of Medicine (Boston), 275: 1494-1496 (8 ref.),
 1966.

E - intentional - experimental - gen. - case hist. - solvents - humans - adults - male - desc. admin. - intent. inhal. - reg. use - pers. prob. - exhil. - euph. - blood test - EEG - psych. test - urin. test - bone mar. - CNS - kid., liv. - ataxia - dizz. - headache - nausea - tinnitus - tremors B-1989.

This is the first reported case of permanent encephalopathy caused from chronic toluene inhalation in man. Symptoms included: ataxia, tremulousness, emotional lability, diffuse EEG slowing, and diffuse cerebral atrophy on pneumoencephalography. Cerebral degeneration has been reported in dogs, and acute toluene encephalopathy in man. The severity of acute symptoms correlates well with the concentration of the vapors. The patient was a 33 year old male admitted following substitution of carbon tetrachloride (though knowing of its toxicity) when toluene was not available. He had tested the effects of solvents 14 years ago rejecting acetone, benzene, and gasoline. Toluene relieved his chronic anxiety inducing euphoria, excitement, and only occasional unconsciousness. He preferred it to alcohol and had inhaled it almost daily. One gallon lasted 4 - 6 weeks. Tremulousness, chronic anorexia, and bizarre behavior were noted after 2 years but he said he even wanted it when he didn't need it. He had occasionally stopped for up to 6 days. Severe damage from toluene inhalation is probably rare as it is considered only a transient fad of teenagers but possible chronic habituation in adults should be investigated.

133. Kornfeld, S., and Bikeles, G.
 EIN FALL VON CHLOROFORMISMUS. [A case of chloroform addiction].
 Wiener Klinische Wochenschrift (Vienna), 6: 64 (2 ref.), 1893.
 G - intentional - gen. - case hist. - anesth. - humans - adoles. - female - intent. inhal. - reg. use - depress. - depend. - impair. - headache - nausea - tremors - weak. A-1626.

An 18 year old girl came to the emergency section of the hospital complaining of severe headaches. She seemed quite weak and suffered from overall general tremor, especially of both hands. Her pupils were contracted and did not react to light. The remaining physical investigation revealed nothing abnormal except for the increased tendon reflexes. Her mood was one of depression and distress, and she repeatedly asked for chloroform. During a second visit 4 days later, she claimed to feel very well. All her earlier symptoms of physical and mental distress had disappeared. The anamnesis disclosed that 2 years previously, the patient had started using chloroform and hyoscyanus oil for sciatica. Since she found its odour pleasant, she began inhaling chloroform whenever

she had difficulty sleeping. In the first year, she used it 2 - 3 times a week, then almost daily. At one point, she had used some medically prescribed morphine along with it for a few days. In the last few months during which she inhaled chloroform every night, the patient experienced weakness and nausea in the morning. At times, however, she eagerly awaited the pleasure of her next inhalation. Adverse reactions which were always evoked by increased use of the drug passed within a few hours.

134. Kraepelin, E.
 DELIRIEN, HALLUZINOSE UND DAUERVERGIFTUNG. [Deliriums, hallucinosis and chronic poisoning].
 Monatsschrift für Psychiatrie und Neurologie (Basel), 54: 43-92 (37 ref.), 1923.
 G - intentional - gen. - review - anesth. - humans - intent. inhal. - reg. use - hallu. - dizz. - vomit. A-1627.

In the light of available information and observations on the clinical aspects of alcoholism, the author undertakes a comparative study of the symptoms of chronic poisoning by various substances, with particular reference to the occurrence of deliriums and hallucinations. In his discussion on the habitual inhalation of chloroform, the author points out that, in addition to the common symptoms of intoxicative dizziness, poor memory, apathy, and vomiting, rapidly developing mental disorders which resemble those of the alcoholic's delirium have been reported. With chloroform, as with cocaine, carbon disulfide, and benzene, no evidence of withdrawal deliriums can be found in the literature reviewed. On the other hand, cases of simple chronic poisoning and some in which hallucinatory illness occurs have been observed.

135. Kramer, J. P.
 THE ADOLESCENT ADDICT. THE PROGRESSION OF YOUTH THROUGH THE DRUG CULTURE.
 Clinical Pediatrics (Philadelphia), 11(7): 382-385 (3 ref.), 1972.
 E - intentional - experimental - gen. - gen. disc. - solvents - humans - adoles. - intent. inhal. - reg. use - headache B-2058.

Forty-seven patients who were physically addicted to opiates completed extensive questionnaires. The first drug used by nearly half of the patients was glue. The median age of first sniffing was 15 years. This practice had not lasted long with them due to fear of brain damage or because they went on to other drugs. Complaints of headaches, changes in eyesight, and decreased memory with the use of glue were made. Charts of age of first glue use, first

marijuana use, first amphetamine use, and first mainlining of heroin are presented. Eleven of the 47 patients answered "yes" to the question: "Do you feel marijuana use led you to use other drugs?" Twelve of 21 reported having bad trips using glue and a hallucinogen while only 5 out of 19 reported bad trips using a hallucinogen alone.

136. Kramer, R. A., and Pierpaoli, P.
HALLUCINOGENIC EFFECT OF PROPELLANT COMPONENTS
OF DEODORANT SPRAYS.
Pediatrics (Springfield, Ill.), 48(2): 322-323 (7 ref.), 1971.
E - intentional - gen. - case hist. - solvents - humans - adoles. -
female - intent. inhal. - chem. - hallu. - impair. - EEG - ataxia -
tinnitus B-2066.

A short case is presented of a 15 year old girl who had, in the past, used barbiturates, amphetamines, heroin, marijuana, and LSD and who, while participating in a group therapy program, inhaled the contents of deodorant sprays. A younger girl also followed this practice which "brought on a "high" and triggered a "flashback" which was very stimulating". The two girls could distinguish between two kinds of spray which led to a chemical analysis of their contents. The ingredient which seemed to produce the hallucinogenic effect was the propellant, Freon 11, which was absent from the ineffective deodorant spray. Effects of the inhalation include impaired cortical function resulting in impairment of mental activity and muscular coordination, and also tinnitus. It seems that drug users have found another hallucinogenic drug in an over-the-counter product.

137. Krug, D. C., Sokol, J., and Nylander, I.
INHALATION OF COMMERCIAL SOLVENTS: A FORM OF DE-
VIANCE AMONG ADOLESCENTS.
In: Harms, E., (Ed.). Drug Addiction in Youth. New York:
Pergamon Press, 36-45 (19 ref.), 1965.
E - intentional - gen. - gen. disc. - review - solvents - humans -
child. - adoles. - adults - desc. admin. - intent. inhal. - toler. -
toxicol. - euph. - hallu. - impair. - brok. home - peers - low.
class - headache - nausea - tremors - vomit. B-1990.

Solvent abuse is a potentially dangerous practice, both psychologically and physiologically. A discussion of solvents used in model cements, paints, etc. such as aromatic hydrocarbons, halogenated hydrocarbons, ketones, esters, alcohols, and glycol is followed by reviews of several articles including a study by Grabski (Ameri-

can Journal of Psychiatry, 118: 461-462, 1961) in which a 21 year old male, who had sniffed toluene while working in an aircraft plant, had started experimenting with other solvents for their intoxicating effects. Methods of solvent abuse, such as inhaling fumes from glue which has been squeezed into a bag, or inhaling gasoline vapors directly from the container, or saturating a mattress with cleaning fluid and inhaling, are mentioned. It is noted that solvents found in most airplane glues seem to produce a limited tolerance. Physical dependence and withdrawal symptoms resemble those associated with alcohol addiction and may accompany the abuse of many solvents. A table of symptoms of intoxication is presented. It is noted that the abusers are generally from the lower socio-economic groups.

138. Kugelberg, J., and Sköld, G.
 INTOXIKATION MED TRIKLORETYLEN - "SNIFFNING" MED
 DÖDLIG UTGÅNG TROTS INTENSIV BEHANDLING. [Intoxica-
 tion with trichloroethylene - "sniffing" ending with death in spite of
 intensive care].
 Läkartidningen (Stockholm), 66(51): 5332-5335 (3 ref.), 1969.
 S - intentional - gen. - case hist. - solvents - humans - adoles. -
 female - intent. inhal. - reg. use - pharmacol. - impair. - hosp. -
 autop. - blood test - cardiovasc. syst. - kid., liv. - resp. syst. -
 death B-1991.

The case of a 14 year old girl who was admitted to hospital unconscious as a result of trichloroethylene sniffing is described. The patient suffered a cardiac arrest shortly after arrival and all attempts to revive her failed. Autopsy showed extensive myocardial damage as well as damage to the lungs and the liver. Trichloroethylene in various concentrations were found in the brain, liver, and the blood. Reported concentrations of trichloroethylene found in 20 fatal poisonings with this solvent are tabulated. The patient in this case was known to have sniffed the solvent frequently during the months prior to her death confirming the accumulation nature of damage caused by this substance, as described in the literature.

139. Kupperstein, L.
 SUMMARY OF DISCUSSION FROM WORKSHOP "B".
 In: A Conference: Inhalation of Glue Fumes and Other Substance
 Abuse Practices Among Adolescents. Denver: U. S. Department of
 Health, Education, and Welfare, 132-133 (0 ref.), 1967.
 E - intentional - report - solvents - humans - adoles. - intent. in-
 hal. - pers. prob. - cult. depriv. - low. class - courts - couns.
 B-1992.

The two basic issues of concern related to substance abuse is legislation and treatment methods. For the first matter, it is stated that the abuser should not be penalized with the stigma of being a delinquent since such a person may already have psycho-social problems he must live with. As for the second matter, a basic responsibility problem is expressed, "how does the court get the child involved in an appropriate program without labeling him a delinquent". The programs should be treatment-oriented and, in many communities, milieu therapy and informal group meetings for these teenagers are available.

140. Kupperstein, L. R. , and Susman, R. M.
 A BIBLIOGRAPHY ON THE INHALATION OF GLUE FUMES AND
 OTHER TOXIC VAPORS - A SUBSTANCE ABUSE PRACTICE
 AMONG ADOLESCENTS.
 International Journal of the Addictions (New York), 3(1): 177-197
 (219 ref.), 1968.
 E - intentional - gen. - gen. disc. - solvents - humans - adoles. -
 desc. admin. - intent. inhal. - alien. - anx. - passiv. - euph. -
 impair. - cult. depriv. - peers - legis. B-1993.

The first news of high incidence of glue sniffing appeared around 1960, although it was known that this practice was quite prevalent before this publicity. This practice has evolved different ritualistic patterns which are described. There is a strong relationship between glue sniffing and low achievement and the motive for abusing glue is similar to that found with adults who use drugs and alcohol to alleviate frustration and anxiety. The adolescent substance abusers demonstrate an inability to communicate with adult authority figures and demonstrate a form of passive rejection of accepted social practices. Legislation does not seem to be the answer and a discussion supporting this view is given.

141. Langrod, J.
 SECONDARY DRUG USE AMONG HEROIN USERS.
 International Journal of the Addictions (New York), 5(4): 611-635
 (28 ref.), 1970.
 E - intentional - experimental - res. pap. - solvents - humans -
 adoles. - adults - male - intent. inhal. - occas. use - reg. use
 B-2067.

Interviews were held with 422 institutionalized male narcotic addicts in New York City, of whom 45 percent were Black, 30 percent were Puerto Rican, and 25 percent were White, to determine their secondary drug use. The drugs used, besides heroin, were marijuana,

cocaine, hashish, barbiturates, amphetamines, methadone, morphine, methedrine, airplane glue, LSD, opium, and demerol. Most heroin addicts reported having used marijuana and over a third reported having used amphetamines, barbiturates, and cocaine. The mean number of secondary drugs used per addict was 3.4. In this group of addicts, all secondary drugs excluding marijuana were used after the beginning of heroin use for the majority of addicts. The White addicts were much more likely to abuse a larger number of secondary drugs, more than six times than the other two ethnic groups. It was also noted that the addicts who reportedly abstained from heroin for 3 months or longer, were more likely to substitute other drugs during that time if they had a prior history of extensive secondary drug use. In regards to solvent sniffing, 22 percent of the addicts admitted using it, 14 percent using it more than six times. Two-thirds of the sniffers were found among the addicts who were younger and who had used heroin for less than 5 years. Lastly, glue sniffing was found to be more prevalent among the White and Puerto Rican addicts.

142. Laury, G. V.
 L'INHALATION DE LA COLLE: UNE TOXICOMANIE JUVÉNILE?
 [Glue sniffing: a juvenile addiction?].
 Médecine et Hygiène (Geneva), 24(742): 728-729 (11 ref.), 1966.
 F - intentional - gen. - case hist. - gen. disc. - solvents - humans
 - child. - adoles. - desc. admin. - intent. inhal. - reg. use - ali-
 en. - depend. - euph. - hallu. - brok. home B-1994.

The author discusses the recent spread of voluntary inhalation of glue, especially among children and adolescents. It is noted that the effects it produces are similar to those of alcohol (euphoria, "joie de vivre", hallucinations) and the practice of glue sniffing has come to be regarded as a "substitute toxicomania for children". In the introduction, the author mentions reasons for its popularity, namely, low price and easy access along with reasons for its use among the young people. Various methods of inhalation are described and Laury states that the average age of a glue sniffer is 10, while the youngest known case is that of a six year old. In a brief summary of medical literature on the subject, the first known publications made in Sweden, England, and the U. S. are mentioned. It is also noted that up to the year 1960, the question of glue sniffing was practically ignored, and in the same year, the arrest of young people began in various areas of the U. S. with a noticeable increase in the following years even though the majority of the users were not apprehended. Most glues contain organic volatile substances which are described, along with the physical and mental effects they produce after inhalation. The author also presents

6 clinical observations compiled from studies made with 12 glue sniffers in the pediatric centre of a psychiatric hospital. He concludes with a note on the dangers of glue sniffing and suggests precautions that should be made to prevent its further spread.

143. Law, W. R. , and Nelson, E. R.
 GASOLINE-SNIFFING BY AN ADULT.
 Journal of the American Medical Association (Chicago), 204(11):
 1002-1004 (15 ref.), 1968.
 E - intentional - gen. - case hist. - gas. - humans - adults - fe-
 male - intent. inhal. - reg. use - euph. - hallu. - hosp. - blood
 test - EEG - urin. test - ataxia - nausea - tremors - vomit.
 B-1995.

This is the first published account of lead encephalopathy resulting from gasoline sniffing and it urges the consideration of lead poisoning complications in sniffers. A 41 year old female was hospitalized for 29 days. She had fluctuating levels of consciousness, impaired memory, hallucinations, and frightening delusions. She vacillated between euphoria and depression. As well as lead encephalopathy, she had some symptoms of chronic gasoline intoxication: anorexia, weight loss, fatigue, insomnia, irritability, memory loss, confusion, depression, and tremor. She had sniffed gasoline for 3 - 4 hours daily for 8 months. Blood lead level was 0.13 mg./g. whole blood, and the EEG was mildly abnormal. Other tests were normal, and contact with inorganic lead excluded. Treatment included edetate calcium disodium (EDTA) and chlorpromazine administration. The blood lead level and clinical symptoms approached normal simultaneously and 5 months after discharge, she felt well. References are provided to reports of symptomatic relief of organic psychosis due especially to tetra-ethyl lead, and intoxication from gasoline sniffing by 16 adolescents.

144. Lawton, J. J. , Jr. , and Malmquist, C. P.
 GASOLINE ADDICTION IN CHILDREN.
 Psychiatric Quarterly (Utica), 35: 555-561 (10 ref.), 1961.
 E - intentional - gen. - case hist. - gas. - humans - adoles. - fe-
 male - male - intent. inhal. - reg. use - depress. - hallu. - im-
 pair. - cult. depriv. - juven. - hosp. - psychother. - blood test -
 EEG - psych. test A-1629.

Analysis of case histories of 2 boys and 1 girl, ages 12 - 15 years, hospitalized after intentional inhalation of gasoline fumes (1 - 5 times per week for 6 months to 2 years) reveals predisposing factors common to alcohol and drug addiction. These include broken

homes and resultant emotional instability. Inhalers seek to quickly relieve anxiety and tension. They obtain erotic gratification and feelings of security and self esteem. Hallucinations were a prominent feature. Many psychological and other tests were performed, and individual and group psychotherapy applied. Chronic exposure results in weakness, loss of memory, drowsiness, or insomnia. Acute intoxication may cause excitement, incoordination, depression, nausea, and constriction of the throat. Cases may progress to epileptiform seizures, coma, and death. Emergency treatment is difficult as there is no physiological explanation for the exaggeration of symptoms on exposure to the air.

145. Lee, T.
 THE SEDATIVE EFFECTS OF VAPOROUS ETHER RECOGNISED FORTY YEARS SINCE.
 Lancet (London), 1: 164 (0 ref.), 1847.
 E - intentional - lett. ed. - anesth. - humans - adults - male - intent. inhal. - reg. use A-1630.

The writer describes the habit of a colleague (witnessed once, about 1802) of inhaling from 1 or 2 oz. vials several times a day for its soothing effects. This reference may be of interest in any study of the history of etherial suspension of feeling for a short period of time for easing pain and/or anguish.

146. Lindström, F.
 DELIRIUM TREMENS SOM ABSTINENSSYMTOM VID THINNER-SNIFFNING. [Delirium tremens as a symptom of abstinence in thinner sniffing].
 Läkartidningen (Stockholm), 57: 2214-2219 (4 ref.), 1960.
 S - intentional - gen. - case hist. - recom. - solvents - humans - adoles. - male - intent. inhal. - reg. use - depend. - hallu. - impair. - trans. prob. - urban - hosp. - blood test - tremors A-1632.

A trend towards increased sniffing of thinners is discussed. The practice is most common among urban boys 15 to 17 years of age but is attracting younger boys in growing numbers. A case history of a 17 year old boy who had inhaled thinner for two years and who suffered symptoms of delirium following abstinence for one day is described. Prior to hospital admission, the patient had hallucinated and had exhibited psychiatric symptoms for a period of two days. Physical examination showed the patient to be well nourished and in good physical condition. Clinical tests showed no changes in the bone marrow, blood or the liver. Vitamin - B and

central nervous system depressants were administered. Duration of delirium tremors was five and a half days. This case is considered definite proof that thinner is a narcomania-producing substance, as defined by the W. H. O. (1956). A recommendation of reducing the availability of this type of substance through prohibition of sale to minors is made as a preventive measure.

147. Litt, I. F. , and Cohen, M. I.
 "DANGER. . . VAPOR HARMFUL": SPOT-REMOVER SNIFFING.
 New England Journal of Medicine (Boston), 281(10): 543-544 (8 ref.),
 1969.
 E - intentional - gen. - res. pap. - solvents - humans - adoles. -
 female - male - intent. inhal. - pharmacol. - impair. - blood test
 - urin. test - kid. , liv. - nerv. syst. - ataxia - headache - nausea
 - tinnitus - urin. path. B-2081.

Adolescents have found that by sniffing spot-remover, containing trichloroethylene and 1,1,1-trichloroethane, they can get a "high". After reviewing the effects of these solvents on animals, the author reports the results of complete blood counts and urinalyses of ten teenagers, to alert physicians of the potential dangers of this practice. Five of the teenagers had abnormalities of the liver function as indicated by bilirubin, SGOT, alkaline phosphatase prothrombin time, and thymol turbidity. Four of the five became jaundiced within the first week after sniffing and diagnoses of gastroenteritis were made. From the diversity of the subjects, it would seem that this practice is a wide-spread phenomenon in New York City. This new abuse of solvents further complicates an already difficult medical situation.

148. Litt, I. F. , and Cohen, M. I.
 THE DRUG-USING ADOLESCENT AS A PEDIATRIC PATIENT.
 Journal of Pediatrics (St. Louis), 77(2): 195-202 (24 ref.), 1970.
 E - intentional - experimental - res. pap. - solvents - humans -
 child. - adoles. - female - male - intent. inhal. - reg. use - blood
 test - urin. test - kid. , liv. - urin. path. B-2018.

Of 8,689 ambulatory and hospitalized adolescents examined between 1967 and 1969, 1,429 were selected for further study, in part because of suspected delinquency. Three percent of all admissions were due to complications of illicit drug use. Hallucinogens, amphetamines, and barbiturates were second only to heroin in frequency of abuse in this group. Only one glue sniffer was hospitalized. Cleaning fluid was sniffed by some. Age of onset of glue sniffing by 440 in the delinquent group was 6 - 16. Laboratory

evaluation included peripheral blood studies, urinalysis, VD test, and liver function studies. Hepatitis was the most frequent complication; others included secondary amenorrhea, renal failure, eosinophilia, glycosuria, and false positive serologic tests. Elevated serum alkaline phosphatase values were found in 6% of the glue sniffers without other liver function abnormalities. Effects of drug abuse differed in several respects from those reported on adults. Hepatic dysfunction is discussed in relation to cause, by infection via unsterilized needles, or specific hepatotoxic action of some drugs.

149. Litt, I. F., Cohen, M. I., Schonberg, S. K., and Spigland, I.
LIVER DISEASE IN THE DRUG-USING ADOLESCENT.
Journal of Pediatrics (St. Louis), 81(2): 238-242 (9 ref.), 1972.
E - intentional - experimental - gen. - gen. disc. - solvents -
humans - intent. inhal. - reg. use - police - kid., liv. B-2057.

In the 42 month period ending December, 1971, 7,272 patients, identified as drug users, were examined upon admission to a temporary youth detention facility in New York City. A table of the patterns of drug abuse over the four years is given. This paper is a study of the liver function in users of heroin, sedatives, and glue. Of the 982 glue-sniffing adolescents examined, none showed signs of clinical hepatitis. Elevated serum glutamic pyruvic transaminase (SPGT) determinations, used to test the liver function, were found in 22 (2 percent). Five percent had isolated elevations of alkaline phosphatase. The conclusion made in this regard is that airplane glue appears to be benign with regard to production of liver disease.

150. Little, W. T.
DRUG ABUSE AND COURT INTERVENTION.
International Journal of the Addictions (New York), 4(4): 493-497
(0 ref.), 1969.
E - intentional - edit. - recom. - solvents - humans - child. -
adoles. - intent. inhal. - courts - legis. - recidiv. B-1997.

Judge Little approves of court intervention emphasizing protection, not punishment of children, when drugs deprive them of physical and mental controls, and lead to physical damage. Among his 300 Toronto court cases concerning inhalant drug abuse by those under 16 years of age, the recidivism and death rate was low; thanks to referral to the Clarke Institute of Psychiatry or the Ontario Alcoholism and Drug Addiction Research Foundation. Compulsive sniffing is a symptom of underlying social problems. Rejection or some social inadequacy was usually found. Education of the child

and parents proved effective.

151. Louria, D. B.

MEDICAL COMPLICATIONS OF PLEASURE-GIVING DRUGS.

Archives of Internal Medicine (Chicago), 123: 82-87 (48 ref.), 1969.

E - intentional - gen. - gen. disc. - gas. - solvents - humans - intent. inhal. - toxicol. - brain - anemia - ataxia - death - tremors

B-2068.

The author states that with the increase in the use of mind-altering drugs, there will be an increase in the number of patients seen in the medical and psychiatric clinics. The medical complications of these patients should not be made worse through improper therapy. The author, therefore, presents the complications of, and the therapy for the abuse of various drugs under the headings opiates, lysergic acid diethylamide, drugs with atropine-like action, stimulants, ingestion or injection of unknown materials, and combinations of intoxicants. Concerning solvent sniffing, the author states that there may be medical or neurological complications. Aplastic anemia, permanent encephalopathy, severe pulmonary congestion, cerebral edema, and hepatic pathology are all possible. Treatment consists primarily of supportive therapy.

152. Luger, M.

SUBSTANCE ABUSE - A COMMUNITY PROBLEM.

In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of

Health, Education, and Welfare, 126-128 (2 ref.), 1967.

E - intentional - report - solvents - humans - adoles. - passiv. - cult. depriv. - couns.

B-1998.

An increase from 800 cases of drug abuse in New York State in 1962 to 1,100 cases in 1966 (ages 13 - 15) are tabled. Low I. Q., weak personality, passivity, moodiness, and boys pampered by overpermissive mothers were common features of glue sniffers. They want instant gratification and have no confidence in the future.

Feelings of isolation are combated by the "crew concept" - starting a friend on glue. It is considered a group phenomenon. A 1962 study of 31 glue sniffers revealed that 19 either died, were in jail or some mental institution. Of the other 12; 3 were on glue, 6 on heroin, and 3 on alcohol or marijuana. The drug problem is multidimensional. Sensational reports are deplored and realistic attempts to find a solution are described. Practical help is now offered through the empathy of ex-offenders on staff who help with drug prone experimenters, and the rehabilitation of others. Group

discussions, sports, recreation, and medical services to families are provided.

153. Luria, E. , and Meneghini, R.
 SU DI UN CASO DI TOSSICOMANIA DA INALAZIONE DI
 TRICLOROETILENE. [On a case of toxicomania due to trichloro-
 ethylene inhalation].
 Giornale di Psichiatria e di Neuropatologia (Ferrara), 93: 743-757
 (34 ref.), 1965.
 I - intentional - gen. - case hist. - review - solvents - humans -
 child. - intent. inhal. - reg. use - euph. - hallu. - impair. - hosp.
 - psych. test B-2059.

A short review of the relevant literature is followed by a detailed case history of a 13 year old girl addicted to the inhalation of toxic agents. She would inhale trichloroethylene until it put her into a deep sleep lasting for several hours. Her desire for the substance became so ungovernable that to obtain it, she would defy her parents, heedless of their ensuing recriminations. When interviewed in the clinic, she was at first reluctant to discuss her habit but eventually revealed that she had always enjoyed sniffing aromatic odors. Since the age of 8 years, she had occasionally inhaled benzine fumes, but it was not until she was 11 years old that a prolonged inhalation gave her an indescribable sensation which prompted her to repeat the experience. The inhalation of trichloroethylene allowed her to achieve complete loss of consciousness, a state which was preceded by perceptual alterations, certain dream-like manifestations, and sexual excitement (observed by her mother, but denied by the patient). She claimed to be motivated by a desire for the feeling of well-being and relaxation, especially during times of emotional distress. A pathogenetic analysis of the case is offered, emphasizing the psychopathology of the patient. The paper is concluded with a consideration of "the importance of a peculiar coenestofrenic personality for an addictive choice of oral regression".

154. Lynn, E. J. , James, M. , Dendy, R. , Harris, L. A. , and
 Walter, R. G.
 NON-MEDICAL USE OF NITROUS OXIDE: A PRELIMINARY
 REPORT.
 Michigan Medicine (East Lansing), 70: 203-204 (14 ref.), 1971.
 E - intentional - experimental - res. pap. - anesth. - humans - in-
 tent. inhal. - reg. use - exhil. - hallu. - psych. test - nausea
 B-1999.

A report is made on a survey of the non-medical use of nitrous ox-

ide (N_2O), as well as two experiments on the pleasurable effects of N_2O inhalation and its influence on cognitive functioning. The study consisted of 2 human experiments. The first was a pilot study on the general effects of N_2O inhalation performed on 5 "naive" and 5 "sophisticated" subjects, while the second involved administration of 3 tests assessing cognitive functioning of 12 men and 12 women (19 - 30 yr.), both naive and sophisticated, before, during and at 5 and 10 min. periods after the onset of the N_2O effects. The survey showed an increase of the abuse of N_2O , utilising commercial gas tanks, rubber balloons, or plastic bags. In the pilot study all subjects reported an exhilarating "high" with auditory, illusionary, or hallucinatory phenomena lasting for 2 - 3 min. Reverse tolerance was observed and a state of well being was experienced until hours beyond the peak effect. Cognitive functioning was significantly decreased during the intoxication except for the symbol analogies test. The naive and sophisticated groups differed in the extent of subjective responses. The customary use of the gas is said to appear as a safe procedure but the users are alerted to the possibility of impaired performance during intoxication.

155. Malcolm, A. I.

SOLVENT-SNIFFING AND ITS EFFECTS.

Addictions (Toronto), 15(2): 12-21 (10 ref.), 1968.

E - intentional - gen. - gen. disc. - solvents - humans - child. - adoles. - male - desc. admin. - intent. inhal. - toler. - anx. - euph. - hallu. - impair. - deviant behav. - low. class - juven. - kid., liv. - resp. syst. - anemia - death - dizz. - urin. path.

B-2069.

The author discusses most of the various aspects concerning solvent sniffing. Solvents are volatile and lipid-soluble, and most researchers believe that it is the effect of this latter characteristic on the structure and function of the lipid components on the cell membranes of the body which produces the intoxication sought after. The user inhales the vapors in as concentrated a form as possible and the intoxication experienced depends on the intensity of the exposure, the person himself, and on the type of solvent. Tolerance does develop. Sniffing seems to become habitual to a greater degree in those children who have experienced boredom, anxiety, and hostility in their lives. Sniffers are often known by the authorities for previous anti-social activity. They are usually under-achievers and are quite often truant from school. There is no evidence of progression from glue to harder drugs, however, as the author states, "if a person has experienced drug habituation at ten, it seems only likely that he will be less resistant to habituation at twenty".

156. Malcolm, A. I.
ON SOLVENT SNIFFING.
Addiction Research Foundation (Toronto), Unpublished Paper,
10 pp. (7 ref.), 1969.
E - intentional - report - gen. disc. - solvents - humans - child. -
adoles. - intent. inhal. - occas. use - reg. use - chem. - toler. -
anx. - depress. - euph. - hallu. - impair. - brok. home - cult.
depriv. - deviant behav. - juven. - recidiv. - blood test - cardio-
vasc. syst. - nerv. syst. - dizz. B-2000.

Solvent sniffers include children with anti-social personalities; those seeking relief from inadequacies; and bored experimenters. Common products used, and their ingredients are listed. They are volatile hydrocarbons, soluble in fat but not in water. They must have some effect on the fat components of cell membranes of all tissues. Intoxication occurs when cells of the brain are affected. Slurred speech, dizziness, euphoria and sometimes unconsciousness and death from suffocation occur. Distortion of perception and visual and auditory hallucinations may last 5 min. - 1/2 hr. or more, if inhalation is continued. Risks of bizarre behavior are cited. Reports of damage to kidney, liver, and bone marrow are doubted. Symptoms, including EEG abnormalities, apparently do not persist after the period of intense exposure but 6% of a group of sniffers showed chromosomal damage. Tolerance always develops, but habituation appears to be purely psychological. Broken homes and heavy drinking are characteristic of their family life.

157. Malcolm, A. I., Sereny, G., Weiler, R., Smart, R., and
Riley, T. G.
PSYCHOLOGICAL AND PHYSICAL ASPECTS OF SOLVENT SNIF-
FING.
Addiction Research Foundation (Toronto), Unpublished Paper,
56 pp. (30 ref.), 1969.
E - intentional - report - case hist. - review - solvents - humans
- child. - adoles. - intent. inhal. - occas. use - reg. use - chem.
- toler. - anx. - depress. - euph. - hallu. - impair. - brok. home
- cult. depriv. - deviant behav. - juven. - recidiv. - blood test -
cardiovasc. syst. - nerv. syst. - dizz. B-0718.

The appendix includes 4 case histories and quotes of experiences (featuring dizziness, euphoria, and hallucinations) with solvents, reasons for starting inhalation (including anxiety, depression, curiosity, and boredom) and beliefs about the hazards. Lipid soluble volatile chemicals can be intoxicating and are classified according to their chemistry and the substances in which they occur. Reports on accidental poisonings and on the controversy as to the

effects of chronic inhalation are cited. Children sniff to defy, escape, or to conform to peer habits. Studies have concentrated on the two disturbed groups who come from multiproblem families and have low frustration thresholds. A comprehensive Toronto survey of 6,447 students is summarized. The majority of sniffers (those who are not emotionally deprived) do so only occasionally. In a study of 24 sniffers ages 12 to 16 years from Juvenile and Family Court, 19 had psychiatric problems; many had broken homes and/or an alcoholic parent, and had poorer school records (but similar I. Q.) than a control group. A few had tried other drugs and many had tried nail polish remover. Laboratory tests on 28 boys and 2 girls are reported. Hepatic damage was shown by alkaline phosphatase and liver biopsy tests. Chromosome damage was common. No renal or erythropoietic impairment was indicated. All EEGs were normal.

158. Man, P. L.

CASE REPORT OF A PAINT-THINNER SNIFFER (ENAMEL REDUCER).

Journal of the Kentucky Medical Association (Louisville), 67(3):
195-197, 230 (5 ref.), 1969.

E - intentional - gen. - case hist. - solvents - humans - adults -
male - intent. inhal. - reg. use - pers. prob. - hallu. - brok.
home - cult. depriv. - low. class - police - hosp. - EEG - psych.
test B-0719.

This report gives references to glue sniffing in children and adolescents who become temporarily psychotic and to one reference in Sweden on paint thinner addiction in children. This habit seems to be increasing. They seek the same kicks as those on other psychedelic drugs. The case of a 22 year old hospitalized man is described with the final diagnosis being sociopathic personality disorder with no evidence of psychosis. He had inhaled thinner for 15 months and had used marijuana, cocaine, opium, and heroin as well. Description of hallucinations during sniffing are quoted. The hallucinations lasted longer as the habit continued. He generally felt 'high', then experienced the 'trip' and then felt 'high' again for awhile. The EEG reading was normal before, during, and after the 'trip'. The possibility that paint-thinner sniffing lifts the defense mechanism, repression, is discussed. Fantasies permitted him to escape or deny his problems. These seem to stem from a background including low socio-economic family, broken home, rejection, with the father being a heavy drinker and which is consistent with that of most glue sniffers. Symptoms tabled are similar to those after glue sniffing.

159. Mark, I.
 SNIFFING - EN FORM FOR STOFMISBRUG. [Sniffing - a form of addiction].
 Ugeskrift for Laeger (Copenhagen), 131(39): 1661-1665 (13 ref.),
 1969.
 Da - intentional - gen. - review - solvents - humans - child. -
 adoles. - male - intent. inhal. - reg. use - toxicol. - charac.
 desc. - brok. home B-2001.

It is felt that solvent sniffing is a form of psychochemical escapism for the adolescent. A review of the literature is made of the toxicological and the clinical aspects of the practice. The sniffers were found to be boys aged 10 to 16 years with family problems. Characteristics of disharmony, poor contact, emotional frustration plus lack of self confidence were noted. These features led to more difficulties other than the sniffing such as truancy and poor school performance. All efforts should be made for early detection of sniffers and proper treatment should be initiated for them.

160. Massengale, O. N., Glaser, H. H., and LeLievre, R.
 GLUE-SNIFFING PATTERN SIMILAR TO ALCOHOLISM.
 Pediatric Herald (New York), 4(5): 5 (0 ref.), 1963.
 E - intentional - abst. - gen. disc. - recom. - solvents - humans
 - anx. - depress. - disorient. - exhil. - euph. - hallu. - cult.
 depriv. - deviant behav. - low. class - juven. - legis. A-1633.

Although no physical abnormalities were found in 27 youths arrested for glue sniffing, legislation is needed to curb it; to reduce the associated juvenile delinquency. Hallucinations lead to bizarre behavior and antisocial acts. Euphoria may progress to coma. The habit provides escape from anxiety and depression found in the low income, broken homes involving alcoholic parents, which are characteristic.

161. Massengale, O. N., Glaser, H. H., LeLievre, R. E., Dodds, J. B., and Klock, M. E.
 PHYSICAL AND PSYCHOLOGIC FACTORS IN GLUE SNIFFING.
 New England Journal of Medicine (Boston), 269(25): 1340-1344
 (26 ref.), 1963.
 E - intentional - gen. - case hist. - review - solvents - humans -
 child. - adoles. - intent. inhal. - reg. use - anx. - depress. -
 brok. home - cult. depriv. - deviant behav. - low. class - juven.
 - blood test - chromatog. - EEG - psych. test - urin. test A-1634.

Medical and social histories of 25 boys and 2 girls (ages 10 - 16)

who were habitual glue sniffers and arrested in the Denver area are analysed. A high incidence of broken homes, delinquent siblings, parental alcoholism, and low incomes was found. Physical examinations and laboratory tests were normal except for microscopic hematuria in two sniffers. Reports by others of neurologic, hematologic, urinary, and liver abnormalities may be due to components other than toluene, the only volatile solvent in the most popular 'polystyrene cement' used. Deaths have been due to suffocation. Psychological tests showed no abnormalities in cognitive functioning and remarkable consistency in personality patterns. They were passive-aggressive, withdrawn, with some chronic depression. These features resemble those in children addicted to gasoline inhalation, and adult alcoholic patients. Many had experimented with other fumes. Most had been involved in antisocial acts ranging from truancy to homicide while intoxicated. They sought to relieve feelings of anxiety and hostility. Glue sniffing is probably physically harmless but, by reducing inhibitions, inevitably increases delinquency.

162. Mathies, V.

TOLUOLSUCHT. [Toluene addiction].

Medizinische Klinik (Berlin), 65: 463-464 (1 ref.), 1970.

G - intentional - gen. - gen. disc. - solvents - pharmacol. - bone mar. - kid., liv. B-2082.

Referring to M. Heuser's paper in Medizinische Klinik, 63: 1888-1890, 1968 and entitled "Toluene Addiction", the present author questions the responsibility of the supposedly pure toluene in causing the hepatic pathology and the bone marrow damage found in the report. The author feels that the bone marrow degeneration was probably the result of benzene intoxication. It cannot be said that toluene is responsible for these pathologies until it can be determined that the solvent contained no benzene. It is this latter chemical which seems more likely to cause the pathologies discussed. An experiment with toluene and xylene is cited to support this view. M. Heuser replies that his paper dealt more with the psychological aspects of the case study than with the physiological aspects.

163. Meloff, W. A.
 DEVIANT ATTITUDES AND BEHAVIOR OF GLUE-SNIFFERS IN
 COMPARISON WITH SIMILAR AND DIFFERENT CLASS PEER
 GROUPS.
 In: A Conference: Inhalation of Glue Fumes and Other Substance
 Abuse Practices Among Adolescents. Denver: U. S. Department of
 Health, Education, and Welfare, 74-81 (1 ref.), 1967.
 E - intentional - report - solvents - humans - alien. - brok. home
 - low. class - juven. B-2002.

Retreatism is an adaptive activity of chronic alcoholics, drug ad-
 dicts, and, by inference, glue sniffers. In a controlled study,
 characteristics by which male glue sniffers from the Denver area
 differed from non-sniffers included: broken homes, low incomes,
 an average of one year behind peers at school, high absentee rate,
 and low I. Q. and National Achievement scores. Attitudes towards
 cheating, law-breaking, and to individual related items such as
 swearing, girls, parents, and fighting with peers were evaluated by
 a questionnaire. Some of the scores are tabled. More deviance
 was accepted by sniffers in school and law related attitudes but
 individual related attitudes were similar to those of the non-sniffers.
 The school was found, more than any other factor, to contribute to
 the negative self concepts conducive to deviant behavior in other
 spheres.

164. Menschik, H.
 EIN FALL VON BENZOLSUCHT. [A case of benzene addiction].
 Wiener Klinische Wochenschrift (Vienna), 69(43): 825-827 (8 ref.),
 1957.
 G - intentional - gen. - case hist. - solvents - humans - adults -
 female - intent. inhal. - reg. use - anx. - depress. - depend. -
 euph. - hosp. - blood test - bone mar. - cardiovasc. syst. - kid.,
 liv. - dizz. - headache A-0076.

A 36 year old female patient first came in contact with benzene
 during her employment in a watch factory where it was used to
 clean parts. She was impressed by its cleaning power and began
 to use it more and more frequently for domestic purposes. Be-
 cause of its effect on her - a feeling of lightness and well-being -
 she would keep a bottle handy to dispel moods of irritation, anger,
 or depression. She would inhale it until overcome by a slight
 dizziness, then euphoria. Twelve years after her first exposure
 to it, she showed symptoms of hemorrhage, suffered from head-
 aches, gastritis, and various other physical complaints. She also
 had an inordinate craving for fresh fruit. She did not, however,
 connect any of this with her addiction. When the author first visit-

ed her in her apartment, he found her to be pale, prematurely aged, and in a greatly deteriorated nutritional state. Her room was filled with a strong smell of floor wax and the upholstered furniture, including the divan on which she rested, gave off a noticeable odor of benzene. She explained that she had made free use of a 30% benzene solution on the furniture as a moth-control measure. The effects of the solvent also manifested themselves in her domestic helper who complained of headaches, dizziness, and gastrointestinal difficulties, although she had not developed an addiction. The patient's therapy included the elimination of all contact with benzene and antianemia measures. After 4 weeks of treatment, signs of improvement began to appear.

165. Merry, J., and Zachariadis, N.
ADDICTION TO GLUE SNIFFING.
British Medical Journal (London), 2: 1448 (2 ref.), 1962.
E - intentional - gen. - case hist. - solvents - humans - adults -
male - intent. inhal. - reg. use - pers. prob. - hallu. - impair. -
brok. home - hosp. A-0256.

This is the first case history of glue sniffing in Great Britain. A 20 year old man started sniffing 18 months before, increasing his dose from 1/3 of a tube weekly to nightly (squeezing the glue into a handkerchief and putting it in his mouth) and then to using 2 tubes each night. He had pleasant coloured hallucinations. When he tried to stop he had the 'DTs' - cramps in his hands, tingling in his hands and feet, cramps in his abdomen, and frightening hallucinations at night. He was admitted to hospital semicomatose after inhaling 6 tubes in one day. After discharge he resumed the habit and was admitted under the Mental Health Act and against his will after becoming violent and aggressive. His father had drunk heavily and died when the patient was 13, and 2 brothers drank heavily. He was diagnosed as having a psychopathic personality but was released after treatment with tranquillizers for 2 months.

166. Merry, J.
GLUE SNIFFING AND HEROIN ABUSE.
British Medical Journal (London), 2: 360 (3 ref.), 1967.
E - intentional - gen. - case hist. - solvents - humans - adults -
male - pers. prob. - depend. - hallu. - impair. - hosp. B-2003.

This is a case report of a man diagnosed as having a psychopathic personality when hospitalized, previously, in 1962 after glue sniffing. He then tried various drugs until hospitalized while unconscious in 1967 after taking heroin for 6 months and inhaling glue.

He developed jaundice. This is the only case of glue sniffing in Britain but reference to its incidence in the U. S. A. , its prelude there to heroin addiction, its cheapness, and easy accessibility suggest that it may become more common in Britain.

167. Meyer, F.M.

UEBER EINIGE SELTENER VORKOMMENDE FORMEN VON RAUSCHGIFTSUCHT. [On some rarely occurring forms of drug addiction].

Münchener Medizinische Wochenschrift (Munich), 82: 617-618

(0 ref.),

1935.

G - intentional - gen. - case hist. - anesth. - solvents - humans - adults - female - male - intent. inhal. - reg. use - anx. - impair.

A-1635.

Three cases of unusual combined addictions to morphine and other substances are related. Two subjects were doctors, the first of whom, in addition to his morphine habit, would soak cotton wads in 5% and 10% solutions of cocaine and place them in his nostrils. The second would daub his nose with a 5% solution. If cocaine was not available, the latter would inhale ethyl chloride as a substitute. The third case is that of a 34 year old nurse who first came in contact with nitrous oxide during surgery. At night, she would lock herself into the gas-cylinder storage room and undergo self-induced narcosis. During the day, she used ether when it was available, otherwise ethyl chloride, for a narcosis of up to 1 hour in duration. She claimed to prefer the ensuing hangover to the preceding anxiety. Her activities were discovered after a self-administered overdose of opium and analgesic drugs. Several futile treatments were followed by a relapse of ether-taking.

168. Mueller, G. O. W.

IS LEGISLATION THE ANSWER?

Juvenile Court Judges Journal (Chicago), 18(2): 59-63 (1 ref.), 1967.

E - intentional - gen. - gen. disc. - solvents - humans - adoles. - intent. inhal. - legis. - police

B-2004.

As there is little biochemical danger and social evil is only tentatively described at the National Conference on Substance Abuse, a criminal law theoretician assesses the situation and suggests remedies more appropriate than legal action. Some State statutes are described. Maine and Maryland make vapor inhalation illegal; others prohibit possession and sale. The futility of this legislation is demonstrated by witty ridicule. It is normal for a 13 year old to be disturbed, especially sexually, and earlier fads and rituals for relief of tension are described. Puberty cannot be legislated

out of existence. Help from private groups, government agencies, and parents might channel the excess energy into constructive behavior.

169. Mueller, G. O. W.

SUBSTANCE ABUSE - A FORM OF PUBERTY DELINQUENCY
- AS A PROBLEM OF CRIMINAL LAW POLICY.

In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 51-59 (13 ref.), 1967.
E - intentional - gen. - gen. disc. - solvents - humans - adoles. - intent. inhal. - legis. - police B-2005.

As there is little biochemical danger and social evil is only tentatively described at the National Conference on Substance Abuse, a criminal law theoretician assesses the situation and suggests remedies more appropriate than legal action. Some State statutes are described. Maine and Maryland make vapor inhalation illegal; others prohibit possession and sale. The futility of this legislation is demonstrated by witty ridicule. It is normal for a 13 year old to be disturbed, especially sexually, and earlier fads and rituals for relief of tension are described. Puberty cannot be legislated out of existence. Help from private groups, government agencies, and parents might channel the excess energy into constructive behavior.

170. Mullings, E. B.

FLYING HIGH ON AIRPLANE GLUE.

Michigan's Health (Lansing), s. 2, 54: 3-6 (0 ref.), 1966.
E - intentional - gen. - case hist. - recom. - solvents - humans - child. - adoles. - desc. admin. - intent. inhal. - reg. use - toler. - anx. - passiv. - exhil. - euph. - hallu. - impair. - brok. home - deviant behav. - low. class - police - ataxia - tinnitus B-2006.

A case of a glue sniffer is described. Glue vapors insulated him from all hurt. Most sniffers are withdrawn and anxiety-ridden, seeking escape in 'instant bliss'. Some experts see the habit as a cause of antisocial behavior while others see it as a consequence of other difficulties. Most sniffers are males ages 10 to 15 years from the lowest socio-economic group. Benzene is the most toxic ingredient. Others are listed. Glue sniffing may damage the kidneys, liver, bone marrow and the lungs and possibly cause anemia. Of 9 deaths up to 1963, 6 were due to suffocation while 1 involved alcohol. Outward effects resemble alcohol intoxication. Hallucinations are common. Coma and convulsions may occur. Bodily harm

may result from augmented aggressive impulses and feelings of omnipotence while intoxicated. One authority says that many glue sniffers progress to hard drugs. Too much acceptance as a 'harmless practice' has diluted combined efforts to: 1) correct the underlying emotional disorder, 2) tell parents and teachers of the health risks, 3) make it less available, and 4) modify it to eliminate the toxic solvent or add an obnoxious ingredient to it.

171. Musclove, C. E., and Awen, C. F.
 GLUE SNIFFING: REPORT OF A FATAL CASE.
 Canadian Medical Association Journal (Toronto), 104(4): 315-319
 (24 ref.), 1971.
 E - intentional - gen. - case hist. - review - solvents - humans -
 adoles. - male - intent. inhal. - reg. use - chem. - deviant behav.
 - autop. - chromatog. - EEG - brain - kid., liv. - resp. syst. -
 death B-2007.

Details of this 1st reported case of death due to glue sniffing in Canada along with photos of microscopic findings are presented. The 16 year old boy had sniffed for 2 years and died suddenly while inhaling Humbol 77 polystyrene cement. There was no evidence that he had the plastic bag over his head. Gross autopsy findings showed unequally dilated pupils, marked pulmonary edema, and severe passive congestion of the liver and spleen. The pericardium contained 8 ml. of serous fluid. The brain was edematous. Interestingly, the post-mortem blood was fluid and devoid of any clot formation. Microscopic findings confirmed gross findings, and also showed both kidneys congested. Chromatographic analysis of blood, brain, and gastric contents showed the same solvent as in the Humbol 77 glue - trichloroethylene ('TCE'). Trichloroacetic acid is a metabolite of 'TCE', is toxic to tissues, and is excreted through the kidneys. The high CO₂ tension in air re-breathed from a plastic bag of 'TCE' at 5,000ppm. would act as a potent CNS depressant due to anoxia and the toxic effects on the brain tissue. Side effects of 'TCE' overdose in anesthesia are noted. The literature on acute, chronic, and experimental exposures to 'TCE' is reviewed and symptoms are described. The motivation for glue sniffing perversions, increasing among adolescents since 1959, are discussed.

172. Nagle, D. R.
 ANESTHETIC ADDICTION AND DRUNKENNESS: A CONTEMPORARY AND HISTORICAL SURVEY.
 International Journal of the Addictions (New York), 3(1): 25-39
 (52 ref.), 1968.

E - intentional - gen. - gen. disc. - anesth. - humans - adults -
male - intent. inhal. - exhal. - death - tremors B-0720.

"Drunkenness" is caused by very dissimilar drugs. The similarity between quoted subjective experiences under nitrous oxide, LSD, and other 'psychedelic' drugs, in very different personalities, suggests at least a final common physiological pathway. Ether, nitrous oxide, chloroform, and trichloroethylene are easily available anesthetics. Others are listed but the hazards apply mainly to the anesthetists. A death of a patient caused by a drunk anesthetist is reported. Addictions do not incur withdrawal symptoms. Reports of addictions lasting a few months to 30 years (both by inhalation and ingestion and some mixed with other drugs) are given. Chloroform acts faster than ether, and has less depressive after-effects than alcohol. Deaths from overdoses have been reported. Trichloroethylene addiction in industry is reported but is rare among anesthetists. Easy access and frequent contact contribute to addictions.

173. Nevole, S.

PRÍPAD CHLOROFORMOVÉ TOXIKOMANIE. [A case of chloroform addiction].

Časopis Lékařů Českých (Prague), 80(17): 602-607 (3 ref.), 1941.

C - intentional - gen. - case hist. - anesth. - humans - adoles. -
male - intent. inhal. - reg. use - alien. - pers. prob. - depend.
- euph. - hallu. - impair. - deviant behav. - hosp. A-1636.

An 18 year old male was brought to the hospital after consuming 'pyrogallol' and gasoline, then inhaling chloroform until he lost consciousness. It was learned that this was the patient's sixth unsuccessful attempt at suicide. In addition, he had a history of substance abuse which was at first confined mainly to chloroform, but more recently, included a daily combination of morphine, heroin, and cocaine. He was also subject to visual and auditory hallucinations. The patient was found to have a psychopathic nature with an innate tendency towards addiction and had marked features of autism and schizophrenia. The author found misleading, a previous diagnosis which described the patient as an 'ament'. In the clinic, the patient experienced a delayed psychotic development which, the author contends, cannot be explained by his addiction since the excessive use of drugs was not of long enough duration. Rather, he considers the psychosis to have been determined by psychic factors which were also the basis of the patient's recidivism in the past. During his stay in the clinic, he was twice given chloroform to inhale for the purposes of experimental observation.

174. Nitsche, C. J. , and Robinson, J. F.
 A CASE OF GASOLINE ADDICTION.
 American Journal of Orthopsychiatry (New York), 29: 417-419
 (3 ref.), 1959.
 E - intentional - gen. - case hist. - gas. - humans - child. - male
 - intent. inhal. - reg. use - anx. - depress. - passiv. - low. class
 - psych. test A-1637.

Gasoline inhalation first acted as a pacifier for an 18 month old boy on a farm when his mother was away working. He became increasingly addicted to it. Seen in the clinic at age 12, some psychological tests were subnormal, but no organic disturbances were revealed. He had few friends, was unhappy, and was lonely. His father was inadequate and his mother had contemplated divorce in the past. They refused psychotherapy for him. The case is presented for its uniqueness (the only one involving gasoline inhalation of the 3,000 patients at the Children's Service Center). References are given to articles on oral intake.

175. Nomiyama, K. , and Nomiyama, H.
 [EPIDEMIOLOGY OF THINNER SNIFFING].
 Japanese Journal of Hygiene (Tokyo), 24: 454-458 (6 ref.), 1969.
 J - intentional - gen. - gen. disc. - solvents - humans - adoles. -
 male - intent. inhal. - reg. use - metabolism - urin. test - nerv.
 syst. - resp. syst. B-2009.

In 1968, the prevalence of thinner sniffing was found to be about 3 percent of the high school boys in Gunna Prefecture. This was established by determining the presence of the toluene metabolite, hippuric acid, in the urine. The sniffing of thinner was found to be closely connected with smoking and the decrease of the latter precipitated a decrease in the former. Parents had more influence as a control of this abuse than did teachers or the boy's participation in sports.

176. Nurcombe, B. , Bianchi, G. N. , Money, J. , and Cawte, J. E.
 A HUNGER FOR STIMULI: THE PSYCHOSOCIAL BACKGROUND
 OF PETROL INHALATION.
 British Journal of Medical Psychology (London), 43: 367-374
 (6 ref.), 1970.
 E - intentional - experimental - gen. - gen. disc. - gas. - humans
 - child. - adoles. - adults - male - intent. inhal. - chem. - anx. -
 hallu. - brok. home - deviant behav. - peers - psych. test - CNS
 - kid. , liv. - nerv. syst. - resp. syst. B-2010.

The psychosocial motivation of inhalation abuse of gasoline on a remote Australian Aboriginal mission is studied. The study includes a description of the geographical, historical, and social background of the mission; a summary of the toxicology, epidemiology, and clinical features of gasoline inhalation by the mission adolescents; as well as a controlled survey of 22 male gasoline sniffers (ages 7 to 13 years). The variables study consisted of sex, age, scholastic progress, maternal and paternal status, clan affiliation, and the scores on the Rutter Behavioral Questionnaire. Gasoline inhalers were found to have a greater tendency to show tension-discharge symptoms and a majority of them came from two traditionally allied clans. It is suggested that gasoline inhalation antedates, as well as facilitates the tension-discharge inclinations brought about by the social factors contributing to fragmentation of this society.

177. Nylander, I.
 "THINNER" ADDICTION IN CHILDREN AND ADOLESCENTS.
 Acta Paedopsychiatrica (Basel), 29(9): 273-283 (7 ref.), 1962.
 E - intentional - gen. - case hist. - gen. disc. - solvents - humans
 - child. - adoles. - male - intent. inhal. - reg. use - chem. - anx.
 - pers. prob. - exhil. - euph. - impair. - trans. prob. - brok.
 home - cult. depriv. - deviant behav. - hosp. - psychother. - EEG
 - CNS - nausea - tremors A-1636.

Transient epidemics of thinner sniffing by youths have occurred since 1955 in Stockholm. Surveys show that only a hard core group of all the experimenters become chronic sniffers. Most of these come from broken homes. Mental disease and alcohol abuse by parents are common. Data from 20 case histories are tabulated. Risk of addiction equals that of alcohol, symptoms of intoxication are similar but there is no 'hangover'. The relative toxicities of impurities are discussed; benzene being the most toxic. EEGs are abnormal only during the acute phase of intoxication, however, damage to blood forming organs and liver is reported. Abstinence incurs various autonomic vegetative symptoms. Craving for and compulsion to sniff to relieve anxiety develop. Hospital treatment, offering psychotherapy, insulin, and occupational therapy, is discussed and lengthy follow-up advised. The relapse rate is high.

178. Nylander, I.
 THINNER-, ALKOHOL- OCH TABLETTMISSBRUK BLAND BARN
 OCH UNGDOM. KLINISKA SYNPUNKTER. [Thinner, alcohol,
 and drug addiction in children and adolescents. Clinical aspects].
 Nordisk Medicin (Helsinki), 70(32): 896-899 (13 ref.), 1963.

S - intentional - gen. - gen. disc. - solvents - humans - child. -
 adoles. - female - male - intent. inhal. - reg. use - pers. prob.
 - brok. home - cult. depriv. - recidiv. - tremors A-1637.

Those relatively few children and adolescents addicted to thinner, alcohol, and drugs are much like their peers except that they are emotionally immature. Many have serious family problems. The abuse of intoxicants is not usually detected for years until symptoms of tiredness, intoxication, and possibly delirium tremens are noted and the person is hospitalized. The addicts must be closely watched since their recidivism rate is high.

179. Nylander, I.
 "THINNER" ADDICTION IN SWEDEN.
 In; Harms, E. (Ed.). Drug Addiction in Youth. New York:
 Pergamon Press, 49-55 (7 ref.), 1965.
 E - intentional - gen. - gen. disc. - solvents - humans - child. -
 adoles. - male - intent. inhal. - reg. use - chem. - anx. - pers.
 prob. - exhil. - euph. - impair. - trans. prob. - brok. home -
 cult. depriv. - deviant behav. - hosp. - psychother. - EEG - CNS
 - nausea - tremors B-2011.

Transient epidemics of thinner sniffing by youths have occurred since 1955 in Stockholm. Surveys show that only a hard core group of all the experimenters become chronic sniffers. Most of these come from broken homes. Mental disease and alcohol abuse by parents are common. Data from 20 case histories are tabulated. Risk of addiction equals that of alcohol, symptoms of intoxication are similar but there is no 'hangover'. The relative toxicities of impurities are discussed; benzene being the most toxic. EEGs are abnormal only during the acute phase of intoxication, however, damage to blood forming organs and liver is reported. Abstinence incurs various autonomic vegetative symptoms. Craving for and compulsion to sniff to relieve anxiety develop. Hospital treatment, offering psychotherapy, insulin, and occupational therapy, is discussed and lengthy follow-up advised. The relapse rate is high.

180. O'Brien, E. T., Yeoman, W. B., and Hobby, J. A. E.
 HEPATORENAL DAMAGE FROM TOLUENE IN A "GLUE
 SNIFFER".
 British Medical Journal (London), 2: 29-30 (1 ref.), 1971.
 E - intentional - gen. - case hist. - solvents - humans - adoles. -
 male - intent. inhal. - reg. use - hosp. - blood test - chromatog.
 - urin. path. - vomit. B-2083.

A case of a 19 year old glue sniffer is reported to emphasize the fact that this practice may cause serious physical harm. The boy was admitted to hospital after six hours of sniffing a liquid cleaner and consuming three pints of beer. While admitted for psychiatric assessment, the patient was transferred to the renal unit after developing periorbital oedema, subconjunctival haemorrhages and having a prothrombin time of 20 seconds and blood pressure of 160/90 mm. Hg. The patient was jaundiced, with a raised serum bilirubin. Tests of infrared spectroscopy and gas chromatography were performed on the liquid cleaner and the blood of the patient and the results are presented. The solvent toluene, present in the cleaner, caused reversible renal and hepatocellular toxic effects.

181. O'Connor, W. A.

A CASE OF TRICHLOROETHYLENE ADDICTION.

British Medical Journal (London), 2: 451-452 (0 ref.), 1954.
 E - intentional - gen. - case hist. - anesth. - humans - adults -
 male - intent. inhal. - reg. use - depress. - disorient. - hallu. -
 courts - headache - nausea - tremors - vomit. A-1638.

Uses of trichloroethylene in industry, as an anesthetic, analgesic, and by psychiatrists to induce patients to relive traumatic experiences are mentioned. Addicts, using 120 to 180 ml. per day, show a temporary hypomanic phase and disorientation. Tremor, nausea, emotional lability, and frightening hallucinations may occur; perhaps due to its breakdown products, eg. phosgene (heat and light hasten decomposition). A 25 year old man first began experimenting with nitrous oxide, ether, and ethyl chloride while an orderly. He craved sleep and oblivion. At a new job, he soon became addicted to trichloroethylene for 3 years. In the mornings, he felt depressed with sensations blunted. Finally, he reached a stage of queer elation, then again, depression. At this time he beat his mother to death. He was thought to be on good terms with her, but repressed paranoid feelings emerged. Police picked him up, disoriented and violent, but aware of what he had done. He had a history of emotional instability, a broken home, and epileptiform attacks in childhood. An excessive dose, or impurities may have contributed to the maniacal phase, but 5 years addiction to anesthetic drugs indicates some constitutional psychopathy.

182. Oldham, W.

DELIBERATE SELF-INTOXICATION WITH PETROL VAPOUR.

British Medical Journal (London), 2: 1687-1688 (3 ref.), 1961.
 E - intentional - gen. - case hist. - gas. - humans - adoles. -
 female - intent. inhal. - reg. use - pers. prob. - euph. - courts

- juven. - recidiv. - hosp. - probat. , rehab. - nausea - vomit.

A-1639.

At 15, an adopted girl inhaled trichloroethylene secretly for its 'pleasant sensations'. It became unavailable and she substituted lighter fluid or petrol, 3 or 4 times a week for 2 years. She was admitted to a prison hospital at 17 after charges of theft and larceny, and evidence of 'strange behavior'. She reported drowsiness, pleasant excitement, and dreams, then nausea and vomiting following inhalation. There was no sign of mental illness. She had an average I. Q. and said she was happy at home but had no wish to stop the habit. Withdrawal at the hospital caused her to miss the sensations and lose the desire for it. However, after release to a probation hostel, she resumed the habit within 2 months. Striking features are the lack of toxic symptoms and the resemblance to alcohol intoxication. Considering the availability of gasoline, it could become a popular habit for the unstable.

183. Oldschool, O.

ETHER SNIFFERS.

Journal of the American Medical Association (Chicago), 197(2):

13 (0 ref.),

1962.

E - intentional - edit. - gen. disc. - anesth. - humans - intent. inhal. - brain - nerv. syst. - death

A-1640.

An excerpt from an 1824 portfolio, published in 1891, is reprinted. It mentions the ridiculous capers of inhaling ether vapors. This became a fad. Many experimented, including schoolboys, to obtain the exhilarating effects. Ether produces effects on the brain and nervous system similar to those of nitrous oxide. The serious consequences of such actions are stated and the author feels that such inhalation should be condemned.

184. Parker, G.

GLUE SNIFFING.

Criminal Law Quarterly (Toronto), 10(4): 365-366 (0 ref.), 1968.

E - intentional - edit. - solvents - humans - courts - juven. - legis.

B-2012.

Discussed is a decision of a juvenile court judge in a case of a glue sniffing child who was adjudged a delinquent. According to the author, this decision was an unjust stretching of a section of the Juvenile Delinquents Act. It is doubtful that adjudication and placement on probation or committal to training school is efficient in combating the problem of glue sniffing. The extension of the policy

used in handling marihuana offences to glue sniffing is opposed and it is suggested that controls be imposed on the sale of glue, despite the inconvenience it may cause to legitimate users. Finally, the author expresses his fears that the juvenile courts may not be the proper place to deal with glue sniffing and that an alternative social agency, with a more counselling role, should be sought.

185. Parker, G.

GLUE SNIFFING.

Criminal Law Quarterly (Toronto), 11(2): 175-185 (2 ref.), 1968.

E - intentional - gen. - gen. disc. - solvents - humans - child. -
adoles. - intent. inhal. - exhil. - hallu. - courts - legis. - police
- brain - CNS - kid. , liv. - anemia - death B-0721.

The author expands on the efficacy of Judge Little's decision to charge a glue sniffer as a delinquent. His colleagues dismiss similar cases. Legal interpretations, aims, and social aspects are examined. Sections of the Canadian Juvenile Delinquents Act are quoted. No crimes are defined; the mere act of delinquency is the offence. This, being necessarily vague, is subject to abuse. Juvenile delinquency, in the act, is seen as a "state of maladjustment", not an offence. The children are in need of guidance, not punishment. The sniffer is the only victim of his 'crime'. Aplastic anemia, pulmonary congestion and edema, kidney and liver damage, harm to the CNS, and a few deaths have been reported. This applies to various substances inhaled for 'intoxication', or various sensations including hallucinations, delirium, and exhilaration. Pressure from parents have forced police to act, so that more 'official' cases of glue sniffing are being brought to court in Toronto. As this leads to referral to appropriate agencies for help, the charge of delinquency seems unnecessary.

186. Parral, J., Vallejo, N., and Gimenez, E.

TOXICOMANÍA INFANTIL: INHALACIÓN DE HIDROCARBUROS. COMENTARIO SOBRE EL PRIMER FOCO DETECTADO EN NUESFRO MEDIO. [Childhood addiction: inhalation of hydrocarbons. Comments on the first incidence detected in our area].

Archivos Argentinos de Pediatría (Buenos Aires), 64: 131-136 (17 ref.), 1966.

Sp - intentional - gen. - case hist. - solvents - humans - child. -
intent. inhal. - reg. use - pers. prob. - depend. - euph. - hallu.
- impair. - deviant behav. - peers - mid. , upper class - hosp. -
psych. test B-2013.

The clinical, psychological, and social aspects were studied in 7

cases of children between the ages of 8 and 11 years who inhaled hydrocarbons. Naphtha was either purchased or stolen from their homes and inhaled from rags which had been soaked in it and then wrapped in handkerchiefs. The children lived in the same geographical area and the communication of their habit took place in school. It was later continued at home among groups of brothers and sisters. Common to the familial life of all the subjects was the situation of affective deficiency. The paternal figures were submissive while the mothers were dominant and had difficulty expressing emotion. The authors compare their own observations to foreign reports of glue sniffers. They conclude that both habits are not in themselves maladies, but rather the symptomatic expression of an emotional alteration or basic personality disorder. With regard to the 7 cases under discussion, it is suggested that the symptoms represent an intention to recreate the situation of primary contact with the mother during lactation, acting like a displacement-substitute for gratification of the incorporative, anal, olfactory, and visual necessities which were limited during infancy. Evidence of a withdrawal syndrome supports the consideration of the habit as a genuine form of addiction.

187. Perli, R. M., Orioli, F. L., and Bekman, S. C.
 NEURITIS RETROBULBAR POR INHALACION DE ALCOHOL DE QUEMAR. [Retrobular neuritis secondary to inhalation of denatured alcohol].
 Archivos de Oftalmologia de Buenos Aires (Buenos Aires), 38:
 430-435 (5 ref.), 1963.
 Sp - intentional - gen. - case hist. - solvents - humans - adults -
 female - intent. inhal. - reg. use - pers. prob. - hosp. - psych.
 test - nerv. syst. A-1641.

A 35 year old woman consulted the ophthalmological unit of the hospital with complaints of a clouding of her vision in both eyes. The cause was diagnosed as a bilateral retrobular neuritis and the patient was referred to the neurological unit so that, possibly, the origin of the inflammation could be determined. It was discovered that, at the age of 33 and during her second pregnancy, the patient had begun compulsively inhaling denatured alcohol (a substance used in the preparation of industrial solvents, etc., containing methyl alcohol, methanol, or wood spirit) in small amounts several times a day. She was a non-smoker and drank only moderately. In addition to the clinical and neurological examinations, the results of which are given in detail, the Bender and Machover psychological tests were performed. The latter indicated conversion hysteria with schizoid personality features. The author concludes that the prolonged and repetitive inhalation of the toxic a-

gent was, in this rare case, primarily a symptomatic expression of the patient's psychopathic disposition.

188. Peters

ÜBER EINEN FALL VON NEURITIS RETROBULBARIS DURCH CHRONISCHE BENZINVERGIFTUNG. [On a case of neuritis retrobulbaris from chronic benzine poisoning].

Deutschen Medicinischen Wochenschrift (Stuttgart), 25(41): 249

(3 ref.),

1900.

G - intentional - gen. - case hist. - solvents - humans - adoles. - female - intent. inhal. - reg. use - depend. - hosp. - nerv. syst.

A-1642.

A 14 year old girl was for years in the habit of inhaling fumes from a benzene-soaked rag, especially before going to bed. This practice was carried on with such determination that no amount of admonishments or discipline on the part of her mother could prevent it. As a result, the girl developed partial loss of sight due to a central relative scotoma. Since the mother's occupation required the use of benzene as a cleaning agent, a supply was constantly on hand. The physician, therefore, recommended that the patient be sent away from home. Within a few months, the relative scotoma was found to have healed. In conclusion, the author briefly discusses the occurrence of benzene as an addictive agent.

189. Pierson, H. W., Jr.

GLUE SNIFFING, A HAZARDOUS HOBBY.

Journal of School Health (Columbus), 34: 252 (0 ref.),

1964.

E - intentional - gen. - gen. disc. - recom. - solvents - humans - child. - adoles. - intent. inhal. - exhil. - hallu. - impair. - cardiovasc. syst.

A-1643.

School children, as young as 6 years old, indulge in glue sniffing as one of the latest of man's unusual ways of getting "kicks". Adults are urged to detect and stop the activity as unconsciousness and death by asphyxiation, or serious blood disorders may occur.

190. Pohlisch, K.

ÜBER PSYCHISCHE REAKTIONSFORMEN BEI ARZNEIMITTELVERGIFTUNGEN. [On psychic forms of reaction during drug poisonings].

Monatsschrift für Psychiatrie und Neurologie (Basel), 69: 200-202, 264-292, 364 (15 ref.),

1928.

G - intentional - gen. - case hist. - gen. disc. - review - anesth.

- humans - adults - male - intent. inhal. - occas. use - reg. use -
 anx. - depress. - pers. prob. - disorient. - euph. - hallu. - hosp.
 A-1644.

The effects of ether and chloroform abuse are examined in the subsection of the paper dealing with inhalation anesthetics and in the sectional summary on narcotics of the aliphatic series. Information is drawn from available published case reports and from clinical observation. Of the latter, 2 cases concern ether abusers. The qualities of ether and chloroform which make them attractive methods of intoxication are compared, and the various common pathological symptoms of their chronic use are listed. However, because of the brevity of existing reports on abusers, the author finds that a clear psychiatric picture is difficult to deduce. This aspect is given prominence in his own report of a 37 year old man who entered the clinic for treatment of acute psychosis resulting from a 2 day spree of ether inhalation. He heard commanding voices, imagined the presence of people, had delusions of persecution, and suicidal intentions. The pattern of hallucinosis was also coupled with a transitory state of disorientation. The amount of ether consumed prior to admission was unknown, but the disclosure of 4 years of periodic abuse must be taken into account when considering this psychotic reaction. The patient had a severely psychopathic personality with a tendency to hysterical states of semi-consciousness and depression. The latter gave rise to his inhalations which, evidently, occurred at quite regular intervals of 2 weeks. Thus, in this instance, the hysterical coloring of the toxic states was linked to a corresponding personality factor.

191. Powars, D.
 APLASTIC ANEMIA SECONDARY TO GLUE SNIFFING.
 New England Journal of Medicine (Boston), 273(13): 700-702
 (6 ref.), 1965.
 E - intentional - gen. - case hist. - solvents - humans - adoles. -
 female - male - intent. inhal. - reg. use - exhil. - euph. - juven.
 - hosp. - autop. - blood test - bone mar. - brain - anemia - dizz.
 - headache - nausea - vomit. - weak. B-0037.

No hematologic effects from glue sniffing have been reported, previously; but they have followed other types of exposure to benzene. Reactive hyperplasia of the bone marrow progressed to total aplasia and death in a 14 year old boy; a chronic glue sniffer for 3 years. The same pattern occurs in rats after ingestion of benzene. A composite case report of 3 girls and 2 boys (ages 12 to 16 years) with classic clinical and hematological signs of sickle cell disease is presented. All had begun glue sniffing, intermit-

tently, a month before their admissions. Spontaneous crises of this type are rare. Toluene and acetone were the volatile solvents in the glues used. Admitting complaints included headaches, dizziness, progressive lethargy, nausea, vomiting, but no pain or fever. Laboratory tests are detailed. Abnormalities were greatest in the hematologic system. No neurologic defects were found. After transfusions (and withdrawal of the toxic substance), all recovered within 7 days. The aplastic syndrome has not recurred in the 12 to 17 month follow-up period. The habit provides euphoria and relief of pain.

192. Preble, E., and Laury, G. V.
 PLASTIC CEMENT: THE TEN CENT HALLUCINOGEN.
 International Journal of the Addictions (New York), 2(2): 271-281
 (22 ref.), 1967.
 E - intentional - gen. - gen. disc. - solvents - humans - child. -
 adoles. - female - male - desc. admin. - intent. inhal. - reg. use
 - exhil. - euph. - hallu. - impair. - low, class - blood test -
 psych. test - urin. test - CNS - dizz. - nausea - tinnitus - vomit.
 B-2014.

Ancient rituals of inhaling vapors for revelations and later, intoxications with nitrous oxide, ether, and chloroform are mentioned. Psychological effects, comparable to those of hallucinogenic drugs, are obtained from volatile organic solvents; by children, especially. Effects are similar to alcohol intoxication including vivid hallucinations (rarely sexual). Secondary effects include impaired judgement leading to reckless behavior. Recent studies do not indicate irreversible organic damage. The habit provides children with a modern Aladdins lamp. Their drug use indicates a need to create a fantasy world and parallels the growth of adult interest in mind altering drugs, during the '60s. A report of 40 cases (20 from the streets and 20 from a mental hospital), ages 8 to 18 years, and consisting of Negros, Puerto Ricans, and 2 whites from the slums is presented. Excerpts from descriptions of the hallucinations of 10 from each group show no significant differences. Extensive physiological and psychological tests were done. No specific psychopathologic personality emerged.

193. Press, E.
 GLUE SNIFFING.
 Journal of Pediatrics (St. Louis), 63: 516-518 (5 ref.), 1963.
 E - intentional - edit. - gen. disc. - recom. - solvents - humans -
 child. - adoles. - female - male - euph. - hallu. - juven. - police
 - ataxia - dizz. - nausea - vomit. A-1645.

A new way of attaining temporary euphoria has gained popularity, mainly with the 9 to 16 year olds. They sniff glue for a few minutes at a time but at much higher concentrations than industrial exposures. Ingredients are listed - toluene being the chief one. Gasoline and other solvents, also potentially toxic, are being used for the same effects. No proof of irreversible damage to liver, kidneys, or bone marrow has yet been published. Early symptoms resemble those of alcohol intoxication, or excitement stages of inhaling ether or nitrous oxide. Hallucinations, nausea, and muscular incoordination may appear. Well-adjusted children may experiment once or twice, but others who persist, developing a tolerance but not a true addiction, need help. Reports of more boy than girl sniffers may reflect the fact that most reports come from the police. A coordinated approach should include: 1) correction of any emotional disorder, 2) warnings of health risks, 3) making substances less available, 4) substitution of less toxic solvents, and 5) addition of 'odor retardants'. Help is more constructive than punishment.

194. Press, E., and Done, A. K.
 SOLVENT SNIFFING. PHYSIOLOGIC EFFECTS AND COMMUNITY CONTROL MEASURES FOR INTOXICATION FROM THE INTENTIONAL INHALATION OF ORGANIC SOLVENTS. I.
 Pediatrics (Evanston, Ill.), 39(3): 451-461 (26 ref.), 1967.
 E - intentional - gen. - review - solvents - humans - child. -
 adoles. - female - male - intent. inhal. - reg. use - toler. - toxicol. - euph. - hallu. - impair. - brok. home - cult. depriv. - deviant behav. - juven. - legis. - police - socio. test - CNS B-2015.

Aspects of the inhalation of intoxicants including its incidence, acute effects, behavioral problems, toxic effects, and remedial measures are detailed. All substances share a narcotic action on the CNS. Euphoria, delusions, hallucinations, and unconsciousness (similar to the effects of anesthetics) usually occur. Choice of substance is based on the nature and intensity of effects desired, expense, and availability. More boys than girls indulge and more Spanish-Americans seem to indulge. Poor scholastic records (not necessarily low I. Q.), high incidence of family disorganization, alcoholism, and weak father models were common features. The similarity of psychosocial factors in sniffers, narcotic addicts, and alcoholics suggests that one may progress to another. Statistics from many studies are tabled. Sniffers are accident prone and commit anti-social and/or self-destructive acts. Most toxicity studies relate to industrial exposures or animals. The validity of specifically attributing fatalities and damage to the kidneys, liver, and bone marrow to toluene or other substances is questioned due to their usual contamination with benzene.

195. Press, E. , and Done, A. K.
 SOLVENT SNIFFING. PHYSIOLOGIC EFFECTS AND COMMUNITY CONTROL MEASURES FOR INTOXICATION FROM THE INTENTIONAL INHALATION OF ORGANIC SOLVENTS. II.
 Pediatrics (Evanston, Ill.), 39(4): 611-622 (10 ref.), 1967.
 E - intentional - gen. - review - solvents - humans - toler. - depend. - euph. - impair. - legis. - recidiv. - psychother. - blood test - EEG - urin. test - bone mar. - death - dizz. - urin. path.
 B-2016.

As chronic inhalation of solvent vapors is now well known to provide a cheap escape, more children are indulging in it. Some routinely experience hallucinations while others never do. Hematologic, renal, and hepatic findings are tabled. The toxic potential depends on the constituents. Abnormalities seem transient. EEGs were normal between periods of intoxication, but permanent brain damage may still occur. Findings in 2 deaths are noted and 10 other deaths due to suffocation are mentioned. Effects of gasoline sniffing resemble mescaline, LSD, psilocybin, and toluene induced psychotic syndromes. Psychotomimetic effects, with the euphoria, grandiosity, and recklessness experienced, do not warrant equation with alcohol intoxication. Tolerance and compulsive habituation do develop but opinions on physical withdrawal symptoms vary. Legislative and educational controls are discussed. Forced abstinence with no psychotherapy is futile. Treatment of the underlying causes such as emotional deprivation and family disorganization which play a determining role in addictive behavior is required.

196. Press, E. , and Done, A. K.
 EDUCATION ON SOLVENT-SNIFFING.
 Addictions (Toronto), 15(2): 22-23 (1 ref.), 1968.
 E - intentional - gen. - recom. - solvents - humans B-2084.

The authors discuss the conflicting opinions regarding the publicity of the deviant practice of solvent sniffing. The one opinion is that publicity might be harmful in making youths aware of a practice they had not considered, themselves. The second opinion is that publicity should be given to present accurate information which does not exclude the harmful aspects of the practice. This latter opinion holds that any increase in incidence would be caused by more well adjusted youths prone to experiment and who would quickly discord solvent sniffing. The authors feel that in problem areas, judicious publicity is desired in which accurate, unsensational, and unglamorized information is given with overexaggeration of the harmful effects of the practice not included.

197. Press, E. , and Sterling, J.
 GLUE SNIFFING. INCIDENCE, PHYSIOLOGIC EFFECTS AND
 POLICE MEASURES FOR CONTROLLING THE INHALATION OF
 GLUE AND OTHER ORGANIC SOLVENTS.
 Police (Springfield, Ill.), 12(4): 14-20 (1 ref.), 1968.
 E - intentional - gen. - solvents - humans - child. - adoles. - fe-
 male - male - desc. admin. - intent. inhal. - reg. use - toler. -
 euph. - brok. home - cult. depriv. - deviant behav. - detect. -
 juven. - legis. - police - bone mar. - brain - kid. , liv. B-2017.

Various aspects of solvent abuse are considered including the in-
 toxicating solvents used, the cities and states in the U. S. A. having
 legislation to control solvent inhalation, and data on the incidence
 of glue sniffing, alcohol abuse, and narcotic offenses by juveniles.
 Characteristics of sniffers including family disorganization and
 stress on the child are discussed. Ethnic, but not socioeconomic
 factors, appear to be related. Most sniffers have social and psy-
 chological problems. They seek relief in euphoria. Tolerance
 develops but withdrawal symptoms are not comparable to those ex-
 perienceed after opiates. Physiologic, toxic, and behavioral effects
 depend on the individual, the type and amount of solvent inhaled, and
 the frequency of use. Chief toxicologic effects involve the kidneys,
 blood forming organs, liver, and the brain; but EEGs show no per-
 manent abnormalities. Most deaths have been associated with as-
 phyxiation. Behavioral effects range from passivity to uncontrolled
 aggression, depending on the solvent and the sniffer's personality.
 Hallucinations may occur and induce fatal reckless acts. Advice
 is given to help police detect sniffers. The primary aim is not to
 punish but to obtain help from parents or community social services
 to modify conditions conducive to the habit or to provide psychiatric
 treatment if necessary.

198. Pruitt, M.
 BIZARRE INTOXICATIONS.
 Journal of the American Medical Association (Chicago), 171(17):
 2355 (2 ref.), 1959.
 E - intentional - lett. ed. - gas. - humans - child. - intent. inhal.
 - reg. use - impair. A-1646.

A letter reports inebriation of a 6 year old who had been addicted
 for 18 months to sniffing gasoline. It seems to be a craze in
 Rossville, Ga. , and information about the habit elsewhere is sought.
 Glue sniffing, and reports of adding nutmeg to water or beer to
 become intoxicated cheaply are also briefly mentioned.

199. Quintanilla, J.

GASOLINE SNIFFING.

Texas State Journal of Medicine (Austin), 57: 570-571 (5 ref.),

1961.

E - intentional - gen. - case hist. - gas. - humans - adoles. -
male - desc. admin. - intent. inhal. - reg. use - anx. - pers.
prob. - hallu. - impair. - psychother. - psych. test A-1647.

Excerpts of reports on children (ages 18 months to 17 years) sniffing gasoline, indicating serious personality deviations, are given. Most feel depression and acute anxiety. A new case of a 14 year old boy, not depressed or over-anxious, but distant and affectionless is presented. He sought pleasure (from auditory hallucinations and tingling body sensations) or escape when he felt "mad at the world". Psychological tests were done. He had traits of a schizoid personality. Gasoline sniffing is not confined to one personality type. Anxiety is a common symptom as is the case in alcohol addiction. Associated lead intoxication or chronic brain damage have not been reported. Tolerance apparently does not develop but withdrawal symptoms have been noted in adults after industrial exposures. Further psychiatric study is needed.

200. Redfern, D.

SOLVENT SNIFFING.

Toronto Young Men's Christian Association (Toronto), Unpublished Paper, 9 pp. (0 ref.),

1968.

E - intentional - gen. - gen. disc. - solvents - humans - child. -
adoles. - female - male - intent. inhal. - reg. use - peers -
courts - police - headache - tinnitus B-2019.

This paper is an analysis of observations by a social worker dealing with 51 youths involved in solvent sniffing in Toronto. There was a strong group pattern, especially, a norm in favor of sniffing. Vague motives are quoted. The outstanding feature of intoxication was rapid, extreme mood swings. Many eventually abstained. Others ignored the consequences (eg., medical reports and other ill effects noted by the social worker) for the sake of the immediate pleasure. Persuasive techniques of the social worker are described. His efforts were more successful after, rather than before or during a sniffing party. The 1st weeks of abstinence sometimes brought back physical symptoms and psychological craving. Common mild physical reactions are noted. Chronic symptoms and hallucinations were reported by hard-core sniffers. Some also used other drugs such as alcohol. Community attitudes, and a few court cases are discussed.

201. Rehm, P.
 CHLOROFORMSUCHT. [Chloroform addiction].
 Berliner Klinische Wochenschrift (Berlin), 22(20): 317-321 (8 ref.),
 1885.
 G - intentional - gen. - case hist. - review - anesth. - humans -
 adults - female - male - intent. inhal. - reg. use - hallu. - recid-
 iv. A-1648.

A general discussion on the various physical and psychological effects of chloroform, from both chronic use and acute poisoning, is accompanied by 2 case histories. The first involved a 39 year old druggist who suffered from psychosomatic pains. Prolonged treatment with morphine resulted in addiction. Eventually, because he developed a tolerance to the narcotic, chloroform was substituted. The clinical examination uncovered both physical changes and psychotic symptoms. During his cure treatments, the patient showed quick recovery ability but relapses always occurred. The other patient was a 71 year old woman who had a 30 year history of chloroform abuse. At first, it was inhaled only for headaches and sleeplessness and then was taken daily for its mood-elevating effect. Coupled with this, was the liberal consumption of ether and strong wine. In her 70th year, she fell into a severe and lasting delirium; upon recovery she vowed never to take chloroform again. Subsequently, her alcohol intake increased, large quantities of ether were inhaled, and ethereal drops were consumed. The patient spent most of her time by herself, but when contact with others could not be avoided, she encouraged herself with the drugs mentioned. Although the patient's mental capacity seemed unimpaired, she displayed the uncertainty, distrust, and mendacity peculiar to alcoholics and morphine addicts. The amounts she consumed could not be determined but when alone, she was said to spend most of the time in a semi-intoxicated state.

202. Reith, J. F.
 GLUE-SNIFFERS EN ANDERE SNIFFERS. [Glue sniffers and other sniffers].
 Pharmaceutisch Weekblad (Amsterdam), 101: 994-998 (10 ref.),
 1966.
 D - intentional - gen. - review - solvents - humans - child. -
 adoles. - desc. admin. - intent. inhal. - reg. use - toler. - euph.
 - deviant behav. B-2020.

An extensive review is made of recent literature dealing with the inhalation by juveniles of various popular substances such as gasoline, solvents, and, in particular, glue. In addition to the mention of specific cases, an outline is presented of the sniffing meth-

od and experience as reported by users, and of the physical and psychological disorders which have been observed in them subsequent to prolonged inhalation. Opinions on the further ramifications of the problem are stated. In summation, the author finds that glue sniffing stems from a complex set of factors which include unfavorable social and home conditions, press publicity, and the pervasion of chemicals in our technically dominated society.

203. Rickles, N. K.
CEREBRAL INTOXICATION THE RESULT OF TRICHLORETHYLENE.
Northwest Medicine (Seattle), 44(9): 286-287 (4 ref.), 1945.
E - intentional - gen. - case hist. - anesth. - humans - adults -
male - euph. - impair. - hosp. A-1649.

Early reports on the use of trichlorethylene for relief of pain revealed no toxic effects. In 1936, the first specific toxic response was reported. Psychoses developed in 2 cases. This is the only other case, published in the U. S. A., of a man who became acutely maniacal after excessive inhalation. He sought relief of pain from tic douloureux. Surgery was successful but on the first post-operative day he had to be restrained by hyoscine morphine and a Caroid tablet. He then became mildly paranoic, but mainly euphoric. Treatment consisted of intravenous sodium amytal, glucose, insulin, and vitamin B₁. Recovery was almost complete on the third day when he admitted using 60 drops of trichlorethylene 20 times a day for the previous week instead of the maximum prescribed dose of 4 times a day.

204. Ritti, A.
EIN FALL VON AETHEROMANIE. [A case of ether addiction].
Irrenfreund (Heilbronn), 29: 149-157 (0 ref.), 1887.
G - intentional - gen. - case hist. - anesth. - humans - adults -
female - intent. inhal. - reg. use - anx. - depress. - depend. -
impair. - deviant behav. - mid. , upper class - hosp. A-1650.

The author reports of a case of a 45 year old woman who was admitted to the clinic in a state of complete mental and physical degeneration after being found by the police begging on the streets of Paris in order to get money to satisfy her four-year-long compulsion to inhale ether. The patient, described as a nervous type, was of an elevated upbringing and had first tasted ether at the age of 22 when her doctor prescribed it to her in the form of a syrup, to relieve menstrual complications. Feeling good, the patient took it as often as possible for a period of about 3 or 4 months. It was not

until 20 years later that ether was again prescribed to her to alleviate anemia and gastric pains. Feeling greatly relieved after the medication, the patient became accustomed to keeping a small bottle with her at all times in order to inhale from it whenever the pain became unbearable. The small doses inhaled at first, became larger and larger until the resulting states of drunkenness (excitation, loss of balance) became a compulsive need. The daily inhalations were accompanied by a complete change in character and behavior leading to a life of solitude and idleness. A normal state of depression was transformed into one of gaiety and talkativeness when under the influence of ether. After a few months and one relapse, the patient was released in a state of excellent health and with no apparent need for ether. In the final comment, the author attributes her "degeneration" to heredity, ie., her father died at the age of 54 of cerebral apoplexy and her mother was nervous and eccentric. He accredits her cure to isolation and a complete restriction of medications.

205. Ritti, A.

UN CASE D'ÉTHÉROMANIE. [A case of ether addiction].

Annales Médico-psychologiques (Paris), s. 7, 7: 55-60 (0 ref.),

1888.

F - intentional - gen. - case hist. - anesth. - humans - adults - female - intent. inhal. - reg. use - anx. - depress. - depend. - impair. - deviant behav. - mid., upper class - hosp.

A-1651.

The author reports of a case of a 45 year old woman who was admitted to the clinic in a state of complete mental and physical degeneration after being found by the police begging on the streets of Paris in order to get money to satisfy her four-year-long compulsion to inhale ether. The patient, described as a nervous type, was of an elevated upbringing and had first tasted ether at the age of 22 when her doctor prescribed it to her in the form of a syrup, to relieve menstrual complications. Feeling good, the patient took it as often as possible for a period of about 3 or 4 months. It was not until 20 years later that ether was again prescribed to her to alleviate anemia and gastric pains. Feeling greatly relieved after the medication, the patient became accustomed to keeping a small bottle with her at all times in order to inhale from it whenever the pain became unbearable. The small doses inhaled at first, became larger and larger until the resulting states of drunkenness (excitation, loss of balance) became a compulsive need. The daily inhalations were accompanied by a complete change in character and behavior leading to a life of solitude and idleness. A normal state of depression was transformed into one of gaiety and talkativeness when under the influence of ether. After a few months and one

relapse, the patient was released in a state of excellent health and with no apparent need for ether. In the final comment, the author attributes her "degeneration" to heredity, ie. , her father died at the age of 54 of cerebral apoplexy and her mother was nervous and eccentric. He accredits her cure to isolation and a complete restriction of medications.

206. Rogal, O.

ÜBER DEN TÖDLICHEN UNGLÜCKSFALL EINES ÄTHERSÜCHTIGEN. VERSUCH DER BILDUNG ZWEIER BIOLOGISCHER MERKMALSGRUPPEN AN STELLE DER BISHERIGEN TYPEN-HÄUFUNG IN DER SEXUALPATHOLOGIE. [On the fatal accident of an ether addict. Attempt at the development of two biological character groups in place of the prevailing type accumulation in sexual pathology].

Deutsche Zeitschrift für die Gesamte Gerichtliche Medizin (Berlin), 36: 75-89 (13 ref.), 1942.

G - intentional - gen. - case hist. - anesth. - humans - adults - male - intent. inhal. - reg. use - impair. - deviant behav. - death

A-1652.

A 48 year old man was found dead under unusual circumstances from an ether overdose along with suffocation. The deceased had been accustomed to engaging in certain abnormal sexual practices which bore witness to such deviant tendencies as narcissism, exhibitionism, fetishism, masochism, transvestism, and homosexuality. In addition, he had been addicted to ether for a number of years. He frequently locked himself in a room where he bound and gagged himself, and then inhaled the anesthetic to the point of narcosis. Covering his face was a primitive mask apparatus containing wads of absorbent cloth which permitted the evaporation of large amounts of ether. The author speculates that the fatal results occurred during the first testing of this arrangement, since the extent of its increased effectiveness undoubtedly could not have been calculated. He also discounts the possibility of suicidal intentions, although an exact determination of the causes of death could not be made since no autopsy was performed. Four other cases of suicide in the course of similar activities and one of ether addiction are compared. The motivational circumstances and personality disposition of ether addicts are commented on. The concluding remarks comprise the author's suggestions for the diagnosis of sexual deviants and specific legal measures for their punishment and rehabilitation.

207. Rommeney
 TRICHLORÄTHYLENSUCHT EINER JUGENDLICHEN MIT TÖD-
 LICHEM AUSGANG. [A young girl's fatal addiction to trichloro-
 ethylene].
 Deutsche Zeitschrift für die Gesamte Gerichtliche Medizin (Berlin),
 37: 1-8 (5 ref.), 1942.
 G - intentional - gen. - case hist. - review - solvents - humans -
 child. - adoles. - female - intent. inhal. - reg. use - anx. - de-
 pend. - impair. - autop. - death A-1653.

The case of an adolescent's addiction to trichloroethylene which was first described by Jordi (Schweizerische Medizinische Wochen-
 schrift (Basel), 67(52): 1238-1240, 1937) is recounted. This is
 followed by the report of a 10 year old girl's fatal inhalation of the
 same substance. A supply of the solvent was kept in her home and
 was used as a cleaning agent. Her father first noticed her attrac-
 tion to it several months before her death when he found her asleep
 in the washroom, and she admitted, upon being awakened, that she
 had inhaled trichloroethylene because it smelled so pleasant. She
 was warned of the consequences of repeating this act and the bottle
 was locked in a cupboard. The father believed that this had pre-
 vented her further access to it, but it was later discovered that the
 cupboard could be unlocked by the key to the girl's bureau. The
 deceased was an only child. She had been generally healthy al-
 though underweight from birth and of a delicate and nervous dis-
 position. Her mother's family had a history of alcoholism. A fe-
 male acquaintance observed that the child had had a pronounced
 liking for strong odors. The possibility of intentional suicide was
 rejected. It was therefore concluded, in accordance with the
 autopsy findings, that death resulted from acute accidental poison-
 ing by an unknown but evidently large quantity of trichloroethylene
 which the girl had been disposed to inhaling in an addictive manner.

208. Rosenthal, E.
 BENZINVERGIFTUNG UND BENZINMISSBRAUCH. [Benzene
 poisoning and benzene abuse].
 Centralblatt für Innere Medizin (Leipzig), 15(13): 281-285 (5 ref.),
 1894.
 G - intentional - gen. - case hist. - solvents - humans - adults -
 male - intent. inhal. - reg. use - chem. - anx. - euph. - hallu. -
 hosp. - tremors - weak. A-1654.

The author compares some of the chemical compositions of benzene
 solutions used in industry and as cleaning fluids, and reports 2
 cases of acute and chronic intoxication from such solutions. The
 first concerned the accidental ingestion by an infant while the sec-

and concerned prolonged abuse through inhalation. A 48 year old bandagist was introduced to the pleasant intoxicating effect of benzene vapors by a colleague. Since the substance was easily accessible where he worked, he began to inhale it frequently. For 6 weeks before seeking medical attention, he slept badly and experienced auditory, visual, and tactile hallucinations. He suffered loss of appetite, weakness, and pronounced general tremor. Moreover, he was sometimes overcome by profound states of anxiety that resulted in strong suicidal impulses. When admitted to hospital, he displayed a severe tremor, and in the night, had light deliriums. The administration of several doses of chloral hydrate calmed him and his trembling ceased. He was released after a few days. The author is reluctant to ascribe the patient's condition to his admitted solvent abuse, since he considers it to be equally probable that the symptoms arose from the man's former liberal consumption of alcohol, which had ended at the time his inhalations commenced.

209. Rubin, T.

AN APPEAL FOR EARLY AND INTENSIVE INTERVENTION.

In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 139-140 (0 ref.), 1967.
 E - intentional - report - recom. - solvents - humans - intent. inhal. - reg. use - alien. - deviant behav. - courts - legis. - police - couns. B-2021.

Judge Rubin makes a plea to schools and recreation centres to detect the potential glue sniffer - the under-achiever whose self-confidence is being destroyed and the show-off who needs special direction for his creativity. Case workers are advised to concentrate on family counseling and mental health workers are asked to persist in the follow-ups. Police are asked not to add arrest to the child's already poor self-image but to take him home if intoxicated, unless he has committed an offense. Total prolonged attention is needed following sentencing. Traditional juvenile court probation and delinquency restitutions are not effective in these cases.

210. Samples, V. L.

"SNIFFING" AT McNEIL ISLAND.

American Journal of Correction (St. Paul, Minn.), 30(3): 11, 13, 27 (0 ref.), 1968.
 E - intentional - gen. - gen. disc. - solvents - humans - male - desc. admin. - intent. inhal. - reg. use - euph. - impair. - detect. - couns. - kid. , liv. - resp. syst. - headache B-2022.

Media coverage during 1960 of youths getting intoxicated from glue sniffing prompted preventive and control measures being initiated in a penitentiary. Laquer thinner, gasoline, glue, and 'Toluol' (all available in the workshops) were being inhaled. Hazards to liver, respiratory system, and motor reflexes were publicized. By 1965, the sniffing incidence declined among the white inmates as the novelty wore off and it lost status. However, more Indians and Mexicans indulged. None were custodial problems as the fumes had a calming effect. Some only experimented but others were psychologically addicted. The latter included 10 Indians who were mentally dull, socially inferior, or emotionally unbalanced. Methods of concealment by the inmates are described. Unsuccessful attempts at eradication included: early detection of symptoms, counseling, and disciplinary action.

211. Satran, R., and Dodson, V. N.
 TOLUENE HABITUATION.
 New England Journal of Medicine (Boston), 268(13): 719-721
 (20 ref.), 1963.
 E - intentional - gen. - case hist. - solvents - humans - adults -
 male - intent. inhal. - reg. use - exhil. - impair. - hosp. - blood
 test - EEG - urin. test - nerv. syst. - dizz. - headache - nausea
 - vomit. A-1656.

A few references to studies of intentional inhalation of volatile solvents are given. Industrial experiences with toluene are reported. The Maximum Allowable Concentration is 200 parts per million. Individual susceptibility varies but it has a narcotic effect; first stimulating, then depressing the nervous system function. Patchy loss of myelin was seen in chronic exposure in animals. Conflicting reports on systemic effects in man are reviewed. Some variance may be due to the presence of benzene in some cases. A case of toluene habituation of a man for 10 years is presented. He had acute intoxications with headaches and memory loss, and became unconscious after drinking wine in addition. None of the clinical or laboratory studies showed systemic pathology. The EEG was abnormal but only one recording was done. Enhanced inebriation and loss of consciousness have been seen in other workers exposed to toluene after drinking wine.

212. Scherzer, E.
 ÜBER EINE SELTENE TRICHLORÄTHYLENSCHÄDIGUNG. [On
 an unusual trichloroethylene lesion].
 Psychiatria et Neurologia (Basel), 148: 110-121 (30 ref.), 1964.
 G - intentional - gen. - case hist. - solvents - humans - adults -

intent. inhal. - reg. use - depend. - euph. - deviant behav.

A-1657.

A case is reported in which a 60 year old man was found to be suffering from various physical afflictions as a result of a 4 year addiction to trichloroethylene. He was exposed daily at his job to the fumes. In a subsequent analysis of the matter of occupational addiction, the author remarks on the qualities of trichloroethylene that make it the most frequently abused industrial intoxicant. He then goes on to discuss other contributing factors in such cases of abuse. An evaluation of previous opinions on the causes of addiction is made, and the author questions the notion that a psychopathic personality structure may be ascribed to all addicts, the reported case being cited as an example. It is also suggested that the lack of awareness on the part of both the man exposed and his supervisor regarding the properties of the substances with which they work plays a significant role, and at the same time negates the validity of comparisons between this kind of addiction and others, such as alcoholism. Finally, the symptomatology of acute and chronic intoxication and poisoning is outlined and the potential harm of alcohol and trichloroethylene combinations is pointed out.

213. Schmitt, R. C., Goolishian, H. A., and Abston, S.
GASOLINE SNIFFING IN CHILDREN LEADING TO SEVERE
BURN INJURY.
Journal of Pediatrics (St. Louis), 80(6): 1021-1023 (5 ref.), 1972.
E - intentional - gen. - case hist. - gas. - humans - child. -
adoles. - female - male - intent. inhal. - pers. prob. - deviant
behav. - autop. - death - urin. path. B-2023.

Four cases of solvent sniffing are presented to exemplify the potential danger of fire caused by the ignition of the vapor and the flammable liquids, in particular, gasoline, themselves. Three boys and one girl were severely burned, resulting death in one instance, as a flame was started by the sniffer's friends or the sniffer himself, or, as in one case, by a pilot light of a nearby gas dryer which ignited the high concentration of vapor surrounding them and the gasoline which had accidentally spilled on their clothes. Three of the children, who were 14 years of age, were the ones who were accidentally set on fire by their friends or themselves. They undertook their sniffing away from their homes and two of these were behavioral problem children.

214. Schneck, J. M.
 CHLOROFORM HABITUATION; WITH A CASE REPORT OF ITS
 OCCURRENCE IN SCHIZOPHRENIA.
 Bulletin of the Menninger Clinic (Topeka), 9: 12-17 (4 ref.), 1945.
 E - intentional - gen. - case hist. - anesth. - humans - adults -
 male - intent. inhal. - reg. use - pharmacol. - anx. - depress. -
 exhil. - hosp. - blood test - psych. test - urin. test - nausea -
 urin. path. - vomit. - weak. A-1658.

The toxicity of chloroform and its cross tolerance with alcohol are discussed. Habituation to its inhalation is rare. The history of an adult male from an unstable home (father an alcoholic) is given. A diagnosis of schizophrenia, with symptomatic alcoholism and chloroformism, was made. Physical, laboratory, and psychiatric findings are summarized. His I. Q. was normal but his judgement poor. He began drinking alcohol at 16; had been anxious, depressed, and suicidal. Chloroform habituation started 2 years prior to his requested hospital admission at 35 years of age. He indulged for escape, felt exhilarated, and said it released a lot of latent ideas. He continued drinking to reduce his need for chloroform fearing its toxic effects. The temporary withdrawal from reality provided by this intoxication may substitute for overt schizophrenic behavior; as has been suggested in alcoholism. He became an out-patient after 2 weeks and continued to improve.

215. Schönfeld, A.
 ÜBER CHLOROFORMOMANIE. [On chloroform addiction].
 Medizinische Klinik (Munich), 28(37): 1272-1273 (8 ref.), 1932.
 G - intentional - gen. - case hist. - review - anesth. - humans -
 adults - male - intent. inhal. - reg. use - euph. - impair. - brok.
 home - headache A-1659.

The case of a 37 year old male chloroform addict is related. The man suffered severe headaches as a result of a brain concussion received during the war. To alleviate the pain, he became accustomed to inhaling chloroform. Although he asserted that his inhalations were carried out only for the relief of pain and that he had never experienced any euphoria after them, this claim was contradicted by a report which indicated that, during medical consultation, the patient was found to be in an elated mood and smelling strongly of chloroform. Whether this mood was caused by a simultaneous alcohol intake is difficult to establish. The patient admitted to occasionally drinking 1 or 2 glasses of beer. In the course of a day, he inhaled approximately 100 g. of chloroform. Sometimes he had also taken a small amount orally; once he had drunk an entire bottle and remained unconscious for 3 or 4 days. Upon his

request, he was treated with apparent success by hypnosis. The author discusses the psychopathology of drug addiction, narcomania in particular, and concludes that his patient can easily be classified as belonging to the neurotic group.

216. Seccombe, W.

GLUE SNIFFING IN THE REGENT PARK AREA.

Toronto Young Men's Christian Association (Toronto), Unpublished Paper, 5pp. (0 ref.), 1967.

E - intentional - gen. - gen. disc. - solvents - humans - child. - adoles. - female - male - intent. inhal. - reg. use - depend. - disorient. - euph. - hallu. - low. class - urban - headache B-2027.

A report of a study by a social worker of 30 glue sniffers (ages 11 to 21 years) indicates that the habit is widespread. Some indulge only once while others use 6 to 8 tubes daily. Their 'high' may last a few minutes or up to 5 hours. Some have hallucinations, memory loss, and unpleasant side effects. Some become aggressive and some remain passive during intoxication. Research into effects of drug interaction is needed as many sniffers also use alcohol or amphetamines. Emotional disruption, seen on sudden withdrawal, provides a threat to the sniffer and others. An educative (warning of the physical dangers) rather than a punitive approach was tried. Some became hostile and others anxious, as they were forced to grasp their basic motives for sniffing. Glue is distinctive in that it is usually found pleasurable on the first try, this being in contrast to alcohol, nicotine, and marijuana use. Its popularity is not likely to be confined to the Regent Park area.

217. Sedan

AN AETHEROMANIAC.

New Orleans Medical and Surgical Journal (New Orleans), 11: 355-356 (0 ref.), 1883.

E - intentional - gen. - case hist. - anesth. - humans - child. - male - intent. inhal. - reg. use - exhil. - death A-1660.

A 10 year old boy, puny, anemic, with a blowing (inorganic?) systolic murmur, very imaginative and intelligent craved increasing amounts of ether for exhilaration and to increase his mental powers. He absorbed 100 to 1000 gm. a day by ingestion or inhalation from age 3 to age 12. No accidents were traceable to the effects of the habit. No efforts were successful in reducing the craving. He also began to inject morphine during his last year of life, dying at age 12 from mitral insufficiency.

218. Senate of Canada, Archer, A. B., referring.
 No. 13. First Proceedings on Bill 3-22: "AN ACT TO PROHIBIT THE SALE AND ADVERTISING OF HAZARDOUS SUBSTANCES, TO AMEND THE FOOD AND DRUGS ACT AND THE NARCOTIC CONTROL ACT AND TO MAKE A CONSEQUENTIAL AMENDMENT TO THE CRIMINAL CODE."
 Second Session - 27th Parliament, Senate of Canada. Proceedings of the Standing Committee on Banking and Commerce, 83-85 (21 ref.), 1967.
 E - intentional - report - solvents - humans - child. - adoles. - intent. inhal. - reg. use - exhil. - euph. - impair. - legis. - brain - CNS - kid., liv. - tinnitus B-2024.

Mr. Archer of Toronto, in his brief, lists the solvents used in glues, describes the psychological and physical effects of sniffing, which resembles alcohol intoxication, and outlines the dangers from lack of control after prolonged sniffing. The extent of the fad involving students, ages 8 to 14 years, is indicated and the hazards are stressed. He quotes Dr. Sokol of Los Angeles who answered that glue was a poison, being toxic to the liver and kidneys. Other investigators have reported paralysis and bone marrow depression. Examples of U. S. legislation are given. The senate is asked to set up a committee to deal with the causes of this need to escape from reality, as well as the damage already done. Sniffing is the first step of a maladjusted child towards other drugs, jail, or suicide. The chairman stated that the bill will be passed.

219. Shanholtz, M. I.
 GLUE SNIFFING: A NEW SYMPTOM OF AN OLD DISEASE.
 Virginia Medical Monthly (Richmond), 95: 304-305 (2 ref.), 1968.
 E - intentional - gen. - gen. disc. - recom. - solvents - humans - child. - adoles. - desc. admin. - intent. inhal. - reg. use - toler. - exhil. - euph. - hallu. - trans. prob. - brok. home - low. class - legis. - death B-2025.

At least 9 deaths in the U. S. A. have been attributed to glue sniffing, a problem first recognized in 1959. The aim is to escape from reality via effects resembling acute alcohol intoxication. Bizarre behavior may result in accidents and delinquency. The fad is most prevalent among the 9 to 16 year old boys. Many also drink alcohol. They come from homes conducive to later habituation to alcohol or drugs. Glue sniffing is a new expression of an old disease, the social and emotional deprivation of children. Proof of pathological effects is scanty. Inhalation of noxious substances to produce inebriation is an offence in Virginia. Dr. E. Press is quoted as urging correction of emotional disorders,

education pertaining to the dangers of glue sniffing, substitution of less toxic solvents and the addition of odor retardants.

220. Silverstein, H.
SUMMARY OF DISCUSSION FROM WORKSHOP "A".
In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 129-131 (0 ref.), 1967.
E - intentional - report - recom. - solvents - humans - intent. inhal. - reg. use B-2026.

Court statistics do not indicate the scope of the substance abuse problem. Glue sniffing is thought to be a symptom of social pathology related to the family. Sniffers, unable to adjust, seek only pleasure and see no alternative to substance abuse. They should be helped to express their needs. Organized discussion groups and satisfying substitute activities more acceptable to society should be devised. Improved communication between agencies concerned (including schools and courts) is important.

221. Sioli, F.
GEWOHNHEITSMISSBRAUCH DER INHALATIONSNARKOTIKA UND PSYCHOTISCHE FOLGEN. [Habitual abuse of the inhaled narcotics and psychotic consequences].
Monatsschrift für Psychiatrie und Neurologie (Basel), 68: 551-573 (23 ref.), 1928.
G - intentional - experimental - gen. - case hist. - review - anesth. - humans - adults - male - intent. inhal. - reg. use - depend. - euph. - hallu. - impair. - weak. A-1661.

Following a detailed review of the literature on the abuse of inhalation narcotics, the author describes at length the case of a 28 year old medical doctor who undertook self-experimentation with the anesthetic narcylene (C_2H_2 - a purified form of acetylene). Psychic symptoms appeared during the first experiment and he experienced hallucinations from the second trial, on. The investigation was continued, though no longer for reasons of science, and he became accustomed to inhaling the drug solely for the pleasurable state that it induced. The hallucinations were principally of an auditory nature, his behavior changed noticeably, and after a month, he began hallucinating without narcylene until he reached a state of acute hallucinosis lasting 4 to 5 days. At this time, he requested medical assistance. Within a few weeks he was cured and a follow-up report showed him to be in good health and without any desire for the drug. The author inquires into the causes of the psychosis,

then presents a clinical study designed to ascertain to what extent the narcylyene inhalations were a factor. On the basis of the case at hand, the author doubts that chronic abuse of narcylyene leads to an increase in tolerance, suspecting that habituation is of a psychological, rather than biological, origin.

222. Škoricová, M. , and Molčan, J.
 CATAMNESTIC STUDY ON VOLATILE SOLVENT ADDICTION.
Activitas Nervosa Superior (Prague), 14(2): 116 (0 ref.), 1972.
 E - intentional - gen. - gen. disc. - solvents - humans - adoles. -
 adults - female - male - intent. inhal. - reg. use - pers. prob. -
 euph. - hallu. - mid. , upper class - juven. - hosp. - psychother.
 B-2030.

A catamnestic study was performed on the inhalation abuse of, and addiction to, trichloroethylene and toluene. Two groups of addicts were examined: 1 involving 22 adolescents (14 to 18 years old) and the other, 10 men (18 to 22 years old). Volatile solvents are said to be abused for the induction of elation and euphoria with visual and auditory hallucinations. Of the 22 youngsters, 5 were hospitalized in the psychiatric ward for attempted suicide and 3 of these were classified as schizoid. Two others were diagnosed as having psychopathic traits in their personality. In 6 of the 22, the abuse reached a stage of toxicomanic addiction. All of the 10 men examined had disturbed family lives. The average length of solvent abuse in this group was 1 year with daily inhalation of about 300 ml. of trichloroethylene. Four of them committed sexual excesses during intoxication, 2 were detained for attempted suicide, and 4 tried to combat withdrawal symptoms with sedatives, tranquilizers, and analgesics. All showed a psychopathic development in their personalities. Detoxication, treatment of abstinence symptoms and of depressive decompensation, as well as aversive psychotherapy, were applied with 50 percent success.

223. Smart, R. G. , de Lint, J. E. E. , Giffen, P. J. , Lang, V. ,
 Polacsek, E. , Popham, R. E. , Schankula, H. J. , and Schmidt, W.
 A PRELIMINARY REPORT ON THE ATTITUDES AND BEHAV-
 IOUR OF TORONTO STUDENTS IN RELATION TO DRUGS.
 In: Blachly, P. H. (Ed.), Drug Abuse: Data and Debate. Spring-
 field, Ill. : C. C. Thomas, 153-168 (0 ref.), 1970.
 E - intentional - experimental - res. pap. - solvents - humans -
 adoles. - female - male - intent. inhal. - occas. use - reg. use
 B-2087.

A survey using group discussions and questionnaires was under-

taken in 1968 involving 6,447 students attending grades 7, 9, 11, and 13 in the Metropolitan Toronto boroughs and separate school systems. Approximately 120 students were randomly selected at each grade level within each basic sampling unit which consisted of a high school attendance area including all the elementary and junior high schools feeding into that one school. The drugs considered were alcohol, tobacco, tranquilizers, stimulants, marijuana, glue or other solvents, barbiturates, LSD, other hallucinogens, and opiates. Tobacco and alcohol were the most used drugs at every grade level and for both sexes. Except for tranquilizers, the boys used drugs more than the girls. There was a large increase in the use of drugs from grade 7 to grade 9 followed by decreased use through grades 11 and 13. The only exceptions to this trend were alcohol and tranquilizers which continued to increase in use in grade 13 and the use of glue which reached a peak in grade 7 at 7.2 percent of all the drugs used. The results of this survey indicate that to a large degree, the use of most drugs is experimental in nature. Schools, churches, families, and peer groups were shown to be instrumental in varying degrees in the decisions made by the students. Concerning drug education, 84 percent of the students felt that it should be begun at or before grade 9.

224. Smart, R. G., and Fejer, D.
 THE EXTENT OF ILLICIT DRUG USE IN CANADA: A REVIEW
 OF CURRENT EPIDEMIOLOGY.
 In: Mann, W. E. (Ed.). Social Deviance in Canada. Toronto:
 Copp Clark, 224-238 (19 ref.), 1971.
 E - intentional - experimental - gen. - review - solvents - humans
 - adoles. - female - male - intent. inhal. - occas. use - reg. use
 B-2088.

This paper reviews the fifteen available surveys of illicit drug use in Canada in an attempt to estimate the rates of use for the following drugs: marijuana, LSD, glue, and stimulants. This was done even though the surveys differed in their size, method of sampling, validity of conclusions, and their range of drugs covered. The surveys in four major cities showed that an average of 5.23 percent of the high school students had sniffed glue at least once. However, the variation between the four percentages is greater than for any other illicit drug. Other surveys have shown that glue sniffing has been tried by from 6 percent to 12 percent of the sample populations. The need to investigate unexplored aspects of the extent of illicit drug use is stressed in this paper and comments on the difficulties involved in making accurate drug surveys are presented.

225. Smart, R. G. , Fejer, D. , and White, J.
 DRUG USE TRENDS AMONG METROPOLITAN TORONTO STUDENTS: A STUDY OF CHANGES FROM 1968 TO 1972.
 Addiction Research Foundation (Toronto), Unpublished Paper,
 40 pp. (14 ref.), 1972.
 E - intentional - experimental - res. pap. - solvents - humans -
 adoles. - female - male - intent. inhal. - occas. use - reg. use
 B-2089.

A survey was conducted involving 6,641 Metropolitan Toronto students in grade 7, 9, 11, and 13. An attempt to use a sample of subjects comparable to those samples used in 1968 and 1970 was made. Between 1970 and 1972, the use of illicit drugs such as marihuana, LSD, opiates, speed, other hallucinogens, glue and other solvents has not changed greatly. This is a large change from the large differences in the use of these illicit drugs which took place from 1968 to 1970 in which the rates tripled. This study showed that exposure to illicit drugs had not diminished but the authors could not ascertain whether the increased preventive educational efforts which took place was the reason for the stabilization of the rates of drug use. During this later time period, similar male and female drug use patterns continued although there remained some drugs which were still sex linked. Students who had no father or whose father was unemployed tended to have the highest drug use rates. Since 1968, the proportion of students sniffing glue has declined from 5.7 percent, to 3.8 percent in 1970, and to 2.9 percent in 1972. There is a trend away from glue sniffing by the older students.

226. Sobolevitch, R. H.
 JUVENILE SUBSTANCE ABUSE IN PHILADELPHIA.
 In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 111-118 (0 ref.), 1967.
 E - intentional - report - solvents - humans - adoles. - male -
 intent. inhal. - low. class - mid. , upper class - urban - juven. -
 legis. - police - couns. - CNS B-2029.

In Philadelphia in 1965, only .3 percent of all Juvenile Offences were attributed to glue sniffing. As this is not an offence in itself (legislation is pending), it may not reflect the true extent of the problem. Relative to other forms of delinquency (juvenile delinquency accounts for over 50 percent of the major crimes in Philadelphia), glue sniffing is a minor problem. The city has a relatively low level of substance abuse and drug addiction; yet in New York (90 miles away), there is the highest incidence in the U. S. A. A

pilot research program to examine psycho-social networkd of adolescent dangerous drug users is outlined. The presumption is that although the individual may be disturbed, he is reacting to pressures of the whole group, and his behavior is constantly being reinforced within the group. Milieu, not institutional, therapy will be tried. Results of a 5 year study of 1,000 juveniles (of which 5 percent may be glue sniffers) to compare casework, family, and peer group therapy, may also be useful.

227. Sobolevitch, R.
 SUBSTANCE ABUSE: A GROWING PROBLEM AMONG JUVENILES. (THE DANGER OF GLUE SNIFFING AND SIMILAR INHALANTS).
 Pennsylvania Probation and Parole Quarterly (Harrisburg), 24(1): 33-35 (0 ref.), 1967.
 E - intentional - gen. - gen. disc. - solvents - humans - child. - adoles. - intent. inhal. - cult. depriv. - low. class - courts - police - couns. - death B-2030.

The increasing number of habitual glue sniffers brought to the attention of the Juvenile Court in Denver warranted a special study of 36 of them to develop new approaches to rehabilitation. Groups were compared who received either: 1) intensive group counseling, recreation, and special education, 2) the first approach with no special education, or 3) only individual counseling. Group counseling appears to be the best. Disorganized families were a feature in most studies. Substance abuse (including LSD and marihuana) is considered symptomatic, and legal controls a last resort. Glue sniffing is now a problem in Philadelphia and not only in the slum areas. A local study by psychiatrists is in progress. Comments on a conference included shock at those who advocated harsh laws, unaware that toluene was less dangerous than some substitutes (giving the same high feeling); eg., naphtha which can cause death. More research is required.

228. Sobolevitch, R. H.
 THERAPY AND RESEARCH IN PHILADELPHIA.
 Juvenile Court Judges Journal (Chicago), 18(2): 56-58 (0 ref.), 1967.
 E - intentional - gen. - gen. disc. - solvents - humans - adoles. - male - intent. inhal. - low. class - mid. , upper class - urban - juven. - police - couns. B-2031.

Glue sniffing usually involves middle and lower class boys (ages 13 to 16 years) and seems the most serious in some Jewish and

Roman Catholic areas. Negroes seem to prefer other solvents. As the related crimes are just a small proportion of the 50 percent of all major crime in Philadelphia committed by juveniles, there has been little attention given to control or treatment. Many come to the Jewish Family Service voluntarily. There are few drug addicts in Philadelphia while New York (just 90 miles away) has a major problem. A research project underway will compare the effectiveness of treating juvenile delinquents by traditional case work methods or through milieu therapy techniques using control groups from hospitals or institutions. Psychological tests will be done. About 5 percent of the subjects are expected to be glue sniffers and more involved in other forms of substance abuse. Follow up for 5 years should provide conclusive evidence on the best treatment technique.

229. Sokol, J., and Robinson, J. L.
GLUE SNIFFING.
Western Medicine (Los Angeles), 4: 192-193, 196, 214 (11 ref.),
1963.

E - intentional - experimental - gen. - gen. disc. - solvents - humans - child. - adoles. - female - male - intent. inhal. - reg. use - toxicol. - exhil. - euph. - brok. home - blood test - urin. test - cardiovasc. syst. - CNS - death - dizz. - headache - tremors - urin. path. A-1662.

Social and medical aspects of glue sniffing are considered. It is initially a status-seeking act but is frequently based on emotional insecurity. Often the father is not at home. Fewer Negroes than Whites indulge. Toluene and other solvents which are volatile CNS depressants are listed and reports of their toxicity (mainly in industrial exposures) are discussed. Benzene may be a contaminant accounting for some effects attributed to toluene. Of 89 juvenile glue sniffers, 75.3 percent showed abnormalities in the urine and 76.4 percent in the blood cells. Enzyme, electrolyte, and other blood chemistry were also studied. Physical and mental symptoms include dizziness, euphoria, headache, diplopia, irritation of respiratory membranes, anemia, loss of weight, and tremors. Comments on legislation, need for innocuous substitutes for toxic solvents, and a plea for grants for further research are made.

230. Sokol, J.
GLUE SNIFFING.
Listen (Harriman, Tenn.), 8: 26-27 (0 ref.), 1964.
E - intentional - gen. - gen. disc. - recom. - solvents - humans - child. - adoles. - female - male - desc. admin. - intent. inhal. - reg. use - euph. - brok. home - peers - blood test - urin. test -

kid. , liv. - anemia - dizz. - headache - tremors

A-1663.

Toluene, the main solvent in glue, and other intoxicating solvents are listed. Symptoms, which simulate alcohol intoxication, are noted. Glue sniffing is a sociological, emotional, physical, and environmental problem. A group of 89 boys and girls, 8 to 18 years of age, were studied. Anemia, other blood pathologies, and abnormal urinalyses were found along with some slight liver damage. Need for acceptance and to conform to group mores were the prime motives for sniffing. Fewer Negroes than Caucasians and Spanish-Americans sniffed glue. Some symptoms of the emotional problems related to the "glue fad prone" children are described. Early detection and treatment is advocated. Medical and psychiatric treatment may be indicated. Prophylactic measures outlined include 1) education of youth, parents, teachers, legal authorities, and manufacturers concerning the dangers of the practice and 2) more research.

231. Sokol, J. , and Robinson, J. L.

GLUE SNIFFING.

California Youth Authority Quarterly (Sacramento), 17(3): 40-46
(11 ref.),

1964.

E - intentional - experimental - gen. - gen. disc. - solvents - humans - child. - adoles. - female - male - intent. inhal. - reg. use - toxicol. - exhil. - euph. - brok. home - blood test - urin. test - cardiovasc. syst. - CNS - death - dizz. - headache - tinnitus - tremors - urin. path.

A-1664.

Social and medical aspects of glue sniffing are considered. It is initially a status-seeking act but is frequently based on emotional insecurity. Often the father is not at home. Fewer Negroes than Whites indulge. Toluene and other solvents which are volatile CNS depressants are listed and reports of their toxicity (mainly in industrial exposures) are discussed. Benzene may be a contaminant accounting for some effects attributed to toluene. Of 89 juvenile glue sniffers, 75.3 percent showed abnormalities in the urine and 76.4 percent in the blood cells. Enzyme, electrolyte, and other blood chemistry were also studied. Physical and mental symptoms include dizziness, euphoria, headache, diplopia, irritation of respiratory membranes, anemia, loss of weight, and tremors. Comments on legislation, need for innocuous substitutes for toxic solvents, and a plea for grants for further research are made.

232. Sokol, J.
 A SNIFF OF DEATH.
 FBI Law Enforcement Bulletin (Washington, D. C.), 34(10): 8-10
 (1 ref.), 1965.
 E - intentional - gen. - gen. disc. - recom. - solvents - humans -
 child. - adoles. - adults - female - male - intent. inhal. - reg.
 use - euph. - deviant behav. - juven. - legis. - cardiovasc. syst.
 - CNS - kid. , liv. - resp. syst. - anemia - death - dizz. - head-
 ache - tinnitus - tremors B-2032.

Glue sniffing by many, ages 8 to 18 years, (and a few adults) is a deadly adolescent craze. Toluene, a CNS depressant, is the main ingredient. Reactions include: dizziness, euphoria, diplopia, nystagmus, tremors, chest pain, and loss of weight. Deaths caused directly and indirectly by glue sniffing include: while drinking beer, homicides and accidents while perception was impaired, and due to the toxicity of the solvents. Liver, kidney, and lung damage, and abnormalities in peripheral blood were found among 750 sniffers at Juvenile Hall. Anemia and hematuria were common. Sexual deviations occur. Sniffing is a refuge for physiologically underdeveloped boys from unstable homes. Remedies (aside from medical and psychiatric) involve prevention via: publicizing dangers, research, and legal action.

233. Sokol, J.
 GLUE SNIFFING AMONG JUVENILES.
 American Journal of Correction (St. Paul, Minn.), 27(6): 18-21
 (27 ref.), 1965.
 E - intentional - gen. - gen. disc. - solvents - humans - child. -
 adoles. - adults - female - male - desc. admin. - intent. inhal. -
 reg. use - euph. - deviant behav. - juven. - legis. - cardiovasc.
 syst. - CNS - kid. , liv. - resp. syst. - anemia - death - dizz. -
 headache - tinnitus - tremors - urin. path. B-2033.

Sokol reports on 717 glue sniffers admitted to Juvenile Hall. Toluene is the main glue ingredient; others are listed. Abnormalities in the blood, urine, kidneys, and liver occur. Dizziness, euphoria, hallucinations, loss of weight, tremors, and chest pain are some of the symptoms of intoxication listed. Recklessness, causing violence to oneself and others is common. Deaths have resulted. Hallucinations are described. A few girls, but mostly delinquent boys, indulge. Homosexual and heterosexual activities occur at some sniffing parties. Sniffing is a manifestation of inadequacy and underlying emotional problems (often stemming from lack of love). Few Negroes take up the habit. Prophylactic measures (other than medical or psychiatric) are listed and include: spread-

ing the knowledge of the dangers, obtaining more funds for research, and removing toluene from glues. Beer drinking and glue sniffing have proved fatal.

234. Sokol, J.

GLUE SNIFFING IN LOS ANGELES.

In: Harms, E. (Ed.), Drug Addiction in Youth. New York, Pergamon Press, 46-48 (0 ref.), 1965.

E - intentional - gen. - gen. disc. - recom. - solvents - humans - child. - adoles. - female - male - desc. admin. - intent. inhal. - reg. use - euph. - peers - blood test - urin. test - cardiovasc. syst. - kid., liv. - dizz. - headache - tremors - urin. path.

B-2034.

Abnormalities found in the blood and urine of 89 glue sniffers (ages 8 to 18 years) admitted to Juvenile Hall are tabled. Liver pathology was indicated in 4 cases: in 3 by increased LDH in the serum, and in the other, the thymol turbidity serum was increased. Plastic bags or soaked cloths were used. Immediate effects include dizziness, euphoria, tremors, somnolence, dilated pupils, and chest pain. Underlying causes for glue sniffing include emotional insecurity and pressure to conform to group activities. Steps advised to alleviate the problem include warning youth, the public, legal authorities, teachers, and manufacturers of the dangers and finding funds for more research. Glue solvents (mainly toluene) and other intoxicating organic solvents (found in lighter fluids, cleaning solutions, and others) are listed.

235. Speirs, N. R.

REPORT ON GLUE-SNIFFING.

Addiction Research Foundation (Toronto), Unpublished Paper, 4pp. (20 ref.), 1967.

E - intentional - report - gen. disc. - solvents - humans - child. - adoles. - toler. - depend. - hallu. - impair. - deviant behav. - CNS - kid., liv. - nerv. syst. - headache - nausea - tinnitus

B-2037.

Conflicting reports on the physical damage attributed to glue sniffing may be due to the varied amount of toxic benzene present. Aromatic hydrocarbons have an affinity for nerve tissue. Coma of long duration may result in permanent CNS damage from oxygen deprivation, and can follow a single massive exposure. Chronic exposure may affect the blood-forming tissues; the liver and kidneys. There is no doubt that some dangerous side effects occur. Terrifying hallucinations appear and threats to life result from

aggressive or irrational behavior, or asphyxiation. Tolerance and physical dependence develop but, apparently, no withdrawal symptoms appear on withdrawal. Juveniles over 13 years of age are more likely to seek **other** sources of sensation. Glue sniffing is a symptom. Mental health is at the root of the problem involving complex personality defects.

236. Sterling, J. W.
 A COMPARATIVE EXAMINATION OF TWO MODES OF INTOXICATION - AN EXPLORATORY STUDY OF GLUE SNIFFING.
 Criminal Law, Criminology and Police Science (Baltimore), 55(1): 94-99 (3 ref.), 1964.
 E - intentional - experimental - gen. - gen. disc. - recom. - solvents - humans - child. - adoles. - female - male - intent. inhal. - reg. use - brok. home - deviant behav. - urban - police - recidiv. A-1665.

Personal and social characteristics of 47 glue sniffers and 50 juvenile drinkers, referred by the Chicago police, are compared. The mean age of the sniffers was 13.5 years and of the drinkers, 16.5 years. Sniffers became involved with the police earlier than drinkers, and fewer girls were involved. References to other studies are given. The most common etiological factor associated with delinquency, a broken home, applied equally to both groups. On the basis of repeat offences specifically related to intoxication, glue sniffers appear more committed than drinkers to their habit. All sniffers were white - a high percentage being Spanish-American. The two modes of achieving intoxication tended to be mutually exclusive. Both groups were more prone to misbehave than to commit a crime for personal gain. They were equally likely to act in groups. Sniffers tended more to be concentrated in small areas of the city. Recommendations for control, by warning, teachers, parents, youth, and police juvenile specialists of the risk of habituation, are made. Doctors should be the people to warn of the health hazards.

237. Storath
 HABITUELLER CHLOROFORMMISSBRAUCH. [Habitual chloroform abuse].
 Deutsche Medizinische Wochenschrift (Stuttgart), 36: 1362-1363 (3 ref.), 1910.
 G - intentional - gen. - case hist. - anesth. - humans - adults - female - intent. inhal. - reg. use - hallu. - impair. - hosp. - psych. test A-1666.

A 51 year old woman inhaled 40-60 gm. of chloroform spirit (20-30 gm. of pure chloroform) for 15 years. It had originally been prescribed to her for relief of migraine. At the age of 42, the patient was admitted to hospital with complaints of intense, ostensibly rheumatic pains. She was also subject to feverish dreams, hallucinations, lack of awareness of whether she was awake or asleep, and spoke incoherently. After her release she allegedly abstained from chloroform for 2 years. A recurrence of severe headaches coupled with emotional disturbances led her to resume daily inhalations. Repeated admissions to hospital were always followed by renewed chloroform abuse upon her release, until her activities were eventually discovered. Even during hospitalization, it was learned, she had secretly carried on her inhalations and had sometimes been found in states of unconsciousness. She was referred to the city hospital and came under the observation of the author. Access to chloroform was immediately prevented, and the administration of 'Valerian' and antineuralgics brought about a quick recovery. No physical or psychological alterations which could be traced back directly to her lengthy abuse could be found. Also, there was no sign of tolerance present. After an abrupt and complete withdrawal from the substance, not the slightest abstinence symptom was noted, which the author directly attributes to the absence of addiction.

238. Stüber, K.

GESUNDHEITSSCHÄDIGUNGEN BEI DER GEWERBLICHEN VERWENDUNG DES TRICHLORÄTHYLENS UND DIE MÖGLICHKEITEN IHRER VERHÜTUNG. [Health damage from the industrial use of trichloroethylene and the possibilities of its prevention].

Archiv für Gewerbepathologie und Gewerbehygiene (Berlin), 2:

298-456 (57 ref.),

1931.

G - intentional - gen. - case hist. - gen. disc. - recom. - solvents
- humans - adults - accid. inhal. - intent. inhal. - reg. use - im-
pair. - CNS - nerv. syst.

A-1667.

This paper is divided into the following sections: 1) a general discussion about trichloroethylene and its industrial uses, 2) the illnesses attributed to it (with emphasis on the symptoms of the nervous system) including a discussion about addiction to it, 3) its chemical reactions, 4) the technology of its use and recommended protective measures, and 5) a short conclusion. Included are 9 tables which present a view of 284 cases of illness caused by exposure to the solvent. Separate tables are given to the various operations during which trichloroethylene poisoning occurred. The tables offer information on the specific activity engaged in, the number of fatalities, and up to 11 of the symptoms of poisoning.

In the final summary table, the total count is given which indicates, among other things, that 202 were acute cases, 82 chronic cases, 25 or 8.8 percent of the cases proved fatal, and addiction was involved in 12 cases.

239. Svetlin, W.
 PSYCHOSEN NACH CHLOROFORM-MISSBRAUCH. [Psychoses after chloroform abuse].
 Wiener Medizinische Presse (Vienna), 23(47 & 48): 1481-1483, 1517-1520 (8 ref.), 1882.
 G - intentional - gen. - case hist. - anesth. - humans - adults - intent. inhal. - reg. use - toler. - anx. - hallu. - impair. - hosp. - vomit. A-1668.

Two cases of mental disorder following the abuse of chloroform are comprehensively discussed. In the second instance, a 31 year old pharmacist was unsuccessfully treated with the usual means for the attacks of tic douloureux, and chloroform was eventually resorted to for the severe attacks. At first, only a few deep inhalations were necessary, but soon they no longer sufficed and had to be increased to the point where the patient inhaled to the point of narcosis. Because of the pleasant sensation produced by the drug, he was soon no longer willing to wait for an attack, but carried on his inhalations with steadily decreasing intermittent pauses. For 13 days he was in a state of almost constant chloroform intoxication, and during the last 2 days he became restless, lost his appetite, and vomited mucous matter mixed with blood. He anxiously ran about the room, babbled incoherently, cried constantly for chloroform, and shouted for help against robbers and murderers. During his hospitalization, he continued to have visual and sensory hallucinations. Recovery came 7 days after he was first examined, and except for physical and mental exhaustion, no symptoms remained. Upon returning from a rest trip, he was examined again, and the only testimony to his experience was such a violent aversion to chloroform that the mere recollection of its odor compelled him to suppress a desire to vomit. During the course of his inhalations, the patient had consumed a quantity of about 8000 gm. of chloroform.

240. Takman, J.
 THINNER-, ALKOHOL- OCH TABLETTMISSBRUK BLAND BARN OCH UNGDOM. SOCIALMEDICINSKA SYNPUNKTER. [Thinner, alcohol, and drug addiction in children and adolescents. Social-medical aspects].
 Nordisk Medicin (Helsinki), 70(32): 899-903 (11 ref.), 1963.
 S - intentional - gen. - gen. disc. - solvents - humans - child. -

adoles. - female - male - intent. inhal. - reg. use A-1669.

Thinners and other solvents, alcohol, and narcotic drugs are abused by the young people in Sweden. The sniffing of solvents is a practice of the younger teenagers seldom followed by those over the age of 16 years. Alcohol consumption has increased at a fast rate among the youth. The number of drunkenness convictions has also increased although the number of first offences has virtually remained the same for the past 30 years. Narcotic addiction is prevalent among both girls and boys - an epidemic occurring in Stockholm in 1958-1959. Before this time, amphetamine was the drug initially used by the addicts, however, phenmetrazine is now preferred as the initial drug of abuse.

241. Taylor, W. J. R.
HISTORY AND PHARMACOLOGY OF PSYCHEDELIC DRUGS.
International Journal of Clinical Pharmacology (Munich), 5(1):
51-57 (0 ref.), 1971.
E - intentional - gen. - gen. disc. - anesth. - solvents - humans -
intent. inhal. - reg. use - pharmacol. - depend. - CNS - kid., liv.
B-2085.

The author feels that the medical profession should play a leading role in the controversial areas concerning the use of illicit psychedelic drugs. It is the author's aim to give an accurate account of the history and the pharmacology of psychedelic drugs, under the headings Cannabis; Mescaline; LSD; Amphetamines; Solvents and Spices; and Caffeine, Nicotine, and Alcohol. In discussing solvents, the author states that with these new agents of intoxication there is great potential for serious damage to the liver, kidney, and central nervous system. Airplane glue is now obtainable in a denatured form or having an irritating mustard derivative added. Chronic ether users can possibly develop a form of the DT's on withdrawal and it is also known that alcoholics have a tolerance to ether. Emphasis is placed throughout the article on the need for greater clarity of and for more research dealing with the clinical pharmacology of psychedelic drugs.

242. Teare, D.
A CASE OF POISONING BY ETHYLENE TRICHLORIDE.
British Medical Journal (London), 2: 559 (1 ref.), 1948.
E - intentional - gen. - gen. disc. - solvents - humans - adoles.
- male - intent. inhal. - autop. - resp. syst. - death A-1670.

A 16 year old boy liked either the smell or the sensation produced

by the fumes of ethylene trichloride. Addiction to it has been mentioned in a report on toxicity to organic industrial solvents. In spite of poison warnings he inhaled it from a bucket and died from acute pulmonary edema. The fumes were smelled in the brain, lungs, and stomach. Chief pathological changes were in the respiratory tract.

243. Tefferteller, R.
SUMMARY OF DISCUSSION FROM WORKSHOP "C".
In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 134-135 (0 ref.), 1967.
E - intentional - report - recom. - solvents - humans - intent. inhal. - reg. use - euph. - hallu. - couns. B-2038.

Thoughts of what preventative action should be undertaken before the substance abusing child finds himself in court are expressed. The giving of factual information to the child along with the adult worker retaining his effectiveness through consistency is stressed. The cooperation of retail outlets should be enlisted and treatment, with the help of former users, should be the aim, not punishment.

244. Thomas, L. G.
PREFACE. THE REHABILITATION OF GLUE-SNIFFING BOYS IN DENVER, COLORADO. A SPECIAL PROJECT.
In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 5-18 (0 ref.), 1967.
E - intentional - report - solvents - humans - child. - adoles. - male - intent. inhal. - reg. use - brok. home - low. class - recidiv. - couns. - psych. test - socio. test B-2039.

Need for new approaches to rehabilitation was evident in Denver where about one half of the boys, ages 10 to 17 years, experimented with glue and where warnings were ineffective. A Juvenile Court study showed that glue sniffers tested poorer than other delinquents in most of the 18 aspects of the California Psychological Inventory test listed. Results of sociometric tests are given. Need for escape increases in proportion to frustration, and glue sniffing is a retreatist action. The children feel rejected and weak. Objectives relate to improving the child's ability to handle emotions rather than to just stopping the habit. A study of 3 approaches showed group therapy to be better than intensive one-to-one care. No related physiological damage has been found. Statistics given from a nationwide survey (as to age, sex, race, income, families,

delinquency, and other characteristics) confirm the pattern found in the Denver group.

245. Thomas, L. G.
THE DENVER GLUE SNIFFING PROJECT.
Juvenile Court Judges Journal (Chicago), 18(2): 46-49 (0 ref.),
1967.
E - intentional - gen. - gen. disc. - recom. - solvents - humans -
pers. prob. - brok. home - low. class - couns. B-2040.

Glue sniffing and other forms of substance abuse are symptoms of psychosocial dysfunction. They have high escape value. Opinions of a psychoanalyst, criminologist, and others, as to the sniffer's motivation, are compared and treatment by the co-ordination of disciplines is recommended. Father-deprivation especially, produces emotionally deprived and insecure children who then choose to "act-in". They form into groups, of neighbourhood rejects, which are not the usual type of gang. This is an interim report on the intensive work with a small group of sniffers in Denver. Full-time group workers, probation counselors, and special classes are provided. Most sniffers are from poor families, and many from ethnic minorities. They are difficult to help because of their strong defense against rejection; but skilled leadership seems able to motivate them to give up the self destructive pattern. The peer group approach seems to be more effective than the case-work approach.

246. Todd, J.
"SNIFFING" AND ADDICTION.
British Medical Journal (London), 4(5625): 255-256 (2 ref.), 1968.
E - intentional - lett. ed. - solvents - humans - male - intent. in-
hal. - reg. use - hallu. B-2041.

This letter, giving references to a leading article and report by Dr. J. Merry on addiction to glue sniffing, describes a case of a man (and several friends) who frequently inhaled carbon tetrachloride for its intoxicating effects. He gave up the practice after several experiences of frightening hallucinations.

247. Tolan, E. J. , and Lingl, F. A.
"MODEL PSYCHOSIS" PRODUCED BY INHALATION OF GASOLINE FUMES.
American Journal of Psychiatry (Hanover, N. H.), 120: 757-761
(3 ref.), 1964.

E - intentional - gen. - case hist. - gas. - humans - adoles. - male - intent. inhal. - reg. use - anx. - hallu. - deviant behav. - juven. - hosp. - EEG - psych. test - headache - nausea - tinnitus - vomit. A-1671.

Case histories of two boys (ages 15 and 19 years) hospitalized after habitually inhaling gasoline fumes for 6, and 1 1/2 months, respectively, are given. Verbatim recollections of hallucinations are given and involved distortions of color, sound, shape, space, and time. Billions of ants and half-animal, half-human figures were seen by one. Perceptual content was personally significant. A table lists autonomic-somatic, motor, perceptual, affective, and ideational symptoms of a "model psychosis" produced by mescaline, LSD, and psilocybin, and those produced by gasoline inhalation. Many, including distorted perceptions, hallucinations, and euphoria applied to both groups. Results of psychological tests are summarized, and EEGs were normal. They both had maladjusted impulsive personalities. The one, from a very disturbed home, and the other, probably psychotic, could not resist the habit.

248. Trautman, E. C.

DRUG ABUSE AND SUICIDE ATTEMPT OF AN ADOLESCENT GIRL. A SOCIAL AND PSYCHIATRIC EVALUATION. Adolescence (New York), 1(4): 381-392 (12 ref.), 1966-1967. E - intentional - gen. - case hist. - solvents - humans - adoles. - female - intent. inhal. - reg. use - anx. - depress. - cult. depriv. - courts - hosp. - psychother. - psych. test B-2042.

Statistics indicate a motivational relation between drug dependence and suicide in adolescents. Whether suicide attempts result from distress over the drug habit and its social consequences or whether the motivation was the same as that which caused the use of drugs for emotional relief in the first place, warrants study. The history of a 14 year old illegitimate Negro girl, of lower socio-economic background and from a broken home, is analysed for its social and psychiatric implications including possible suicide prevention. She attempted suicide by drinking Carbona (carbon tetrachloride) which she had habitually sniffed for escape from depression and anxiety caused by the sudden death of her father, rejection by her psychopathic mother and on being raped by her mother's lover. The pattern leading to devious socialization, drug abuse, attempted suicide and, then, case management is described. She recovered after emergency treatment and progressed in a course of psychiatric therapy while living with her grandmother. Missed opportunities for earlier protective intervention are pointed out and functions of community agencies are evaluated.

249. Unwin, J. R.
 ILLICIT DRUG USE AMONG CANADIAN YOUTH: PART I AND PART II.
 Canadian Medical Association Journal (Toronto), 98: 402-407, 449-454 (50 ref.), 1968.
 E - intentional - gen. - gen. disc. - review - solvents - humans - intent. inhal. - reg. use - toler. - depend. - euph. - hallu. - impair. - deviant behav. - detect. - recidiv. - EEG - bone mar. - brain - anemia - dizz. - urin. path. B-2043.

This article attempts to clear up the ambiguities in the information on illicit non-narcotic drugs held by the public. It deals with solvent inhalation, LSD, DMT, STP, nutmeg, amphetamine, marijuana, and hashish. The author gives two references which indicate that glue sniffers tend to have a high association with reported delinquency and school failure. It also gives a reference that deliberate use of solvents has reached epidemic proportions in the U. S. A. A list of products abused and their ingredients are listed. The method of use and the means of detecting the abuser are given. The clinical picture produced by the various solvents include euphoria, slurred speech, dizziness, hallucinations, and, possibly, stupor, convulsions, and loss of consciousness. Possibilities as to the damage caused by chronic abuse as well as to the causes of death are given. The solvents produce tolerance and psychological dependence. It is also mentioned that the gas Freon-12, an odorless, colorless cryogenic gas available in aerosol bombs for chilling cocktail glasses, is also abused. Death results from the freezing of the larynx and subsequent suffocation, and from pulmonary edema. The risk of permanent brain damage from anoxia is also suggested.

250. Vaille, Ch.
 POISONS D'ACTUALITÉ. [Current poisons].
 Presse Médicale (Paris), 74(41): 2117-2119 (10 ref.), 1966.
 F - intentional - gen. - gen. disc. - solvents - humans - child. - adoles. - desc. admin. - intent. inhal. - reg. use - exhil. - euph. - hallu. - impair. - death - dizz. - nausea B-2044.

The author reports that the first signs of extensive glue sniffing among children were noted in Sweden in 1957, but that it was not until 1962 that the subject was discussed by Merry in England and Glaser in the United States. The most popular glues used among children and adolescents, the methods employed to inhale them, and their mental and physical effects are mentioned. The mental effects are related to those of alcohol intoxication, ie., euphoria, excitation, and exhilaration, which may reach an advanced stage of

drunkenness resulting in mental confusion, hallucinations, and a tendency to perform impulsive acts. Physical effects after inhalation include nausea and dizziness. The author states that in 1964 there were 9 known cases of death in the United States, 6 of which were caused by suffocation under plastic bags. He concludes by stating that the public must be made aware of the existence and dangers of this problem in order to prevent its widespread advancement, and mentions efforts being made in the United States to combat it.

251. Védérinne, J., Vitani, Ch., and Tommasi, M.
MORT SUBITE APRÈS INHALATIONS VOLONTAIRES RÉPÉTÉES
DE LAQUE CAPILLAIRE. [Sudden death after repeated voluntary
inhalations of hair lacquer].
Médecin Légale et Dommage Corporel (Paris), 1: 151-153 (5 ref.),
1968.
F - intentional - gen. - case hist. - solvents - humans - adoles. -
female - intent. inhal. - reg. use - impair. - autop. - death
B-2045.

An 18 year old salesgirl was taken ill and died before reaching the hospital. The inquest established that for several days she had been inhaling the contents of a spray can of hair lacquer which was comprised of 91 percent alcohol, 7 percent lacquer (resin), 1.2 percent amino-ethyl-propane-dione, and 0.8 percent perfume. An observer reported that she had carried on these inhalations through her mouth and with an ever increasing frequency. For about 5 months, her father and husband were aware of her tendency to sniff different products, particularly such industrial solvents as fuel oil, trichloroethylene, and benzine (by working overtime, she gained access to the latter substance). She soon began inhaling hair lacquer while at work. An autopsy was performed and the findings are reported. The etiology of death remains in question, however, since grave pulmonary lesions similar to those observed in acute pulmonary edema of toxic origin was found, but the exact mechanism of action of the lacquer (physical, allergic, or reflex) is unclear.

252. Védérinne, J., Cottraux, J., and Evreux, J.-C.
TOXICOMANIE AU TRICHLORÉTHYLÈNE. A PROPOS D'UNE
OBSERVATION. [Trichlorethylene addiction. A discussion of a
case].
Médecin Légale et Dommage Corporel (Paris), 1: 374-376 (3 ref.),
1968.
F - intentional - gen. - case hist. - solvents - humans - adults -

male - toler. - impair. - hosp. - psychother. - blood test - urin.
test - psych. test B-2046.

The author presents a case of trichloroethylene addiction to demonstrate the need for increased concern for this problem. The patient was a 46 year old mechanic who was hospitalized three times in the toxic pathologies department. The subject was first hospitalized after being found unconscious with his nose in a rag soaked in trichloroethylene. At first, it was believed that he was suffering from some psycho-pathology, but it later seemed to be more of an addiction. Two years later he was again hospitalized for the same reason and again the following year. Extensive psychological and physical tests were performed and the results are given. The importance of the levels of trichloroethylene in the blood and urine are emphasized as a tolerance was evidenced. Changes in his home environment (the patient had moved away from his parents with whom he could not relate) facilitated psychotherapeutic efforts being made. Medico-legal considerations were also discussed because of the possible implications surrounding the abuse of, or the addiction to, the substance. The author emphasizes the need for a prolonged clinical and biological surveillance of the patient as well as an intensive psychological examination.

253. Verhulst, H. L., and Page, L. A.
GLUE-SNIFFING.

Bulletin of the National Clearinghouse for Poison Control Centers
(Washington), 1-7 (15 ref.), 1962.
E - intentional - gen. - gen. disc. - review - solvents - humans -
adoles. - male - intent. inhal. - reg. use - chem. - toler. -
toxicol. - euph. - hallu. - deviant behav. - blood test - urin. test
- dizz. - urin. path. A-1672.

Chronic glue sniffing is discussed, particularly in relation to its toxicity. This is difficult to establish for one substance, specifically, from the conflicting reports. The difficulty can be explained by probable unknown exposures to more than one solvent, for different periods, at different concentrations. In Utah, glue sniffing is common among boys who achieve the desired effect of euphoria or drunkenness. Some had hallucinations, behaved recklessly, and developed tolerance. In a report on 12 boys, hematologic and liver function tests were normal but urinalysis showed abnormalities. Other researchers report no abnormalities. A Swedish study of 32 boys is summarized. Toluene is the most usual ingredient in glues, and seems the least toxic; others are listed. Quantitative data on effects of toluene, benzene, and xylene on rats and maximum allowable concentrations for other solvents are noted.

Boys might give up a chemical proved toxic but would substitute another with comparable psychological effects. They are confused by the disagreement among authorities.

254. Verhulst, H. L. , and Crotty, J. J.

GLUE-SNIFFING II.

Bulletin of the National Clearinghouse for Poison Control Centers (Washington), 1-8 (36 ref.), 1964.

E - intentional - gen. - gen. disc. - review - solvents - humans - child. - adoles. - adults - male - intent. inhal. - reg. use - depress. - impair. - low. class - legis. - police - autop. - death - dizz. - headache A-1673.

Legislation against selling glue and against persons sniffing is outlined. This, and the substitution of non-intoxicating solvents, are considered inadequate. A co-ordinated effort including correction of emotional disorders is recommended. Data is quoted from articles reviewed by the National Clearinghouse and which consist of surveys on incidence and legal and health aspects. Symptoms range from headaches and dizziness to unconsciousness. There is no conclusive pattern of physical injury but anemia, other blood pathology, and abnormal urinalyses occur. Systemic damage due to inhalation of organic solvents (with beer drinking a possible aggravating factor) caused 2 of the 9 deaths related to sniffing. The majority of others involved asphyxiation. As the recklessness accompanying the euphoria exceeds that of alcohol intoxication, it encourages delinquency and has proven fatal. Need for preventive action is obvious even without complete data on toxicity.

255. Verhulst, H. L. , and Crotty, J. J.

THE "KICK" HANG-UP.

Bulletin of the National Clearinghouse for Poison Control Centers (Washington), 1-2 (0 ref.), 1967.

E - intentional - gen. - gen. disc. - solvents - humans - intent. inhal. - reg. use - death B-2047.

Since the fad of glue sniffing and other solvent abuse started, publicity, and experiments with many chemicals, particularly psychotomimetics, has increased. Heroin, LSD, STP, and many substances of plant origin, including marijuana, peyote, and morning glory seeds (which may produce a psychosis similar to that brought on by LSD) are used. Atropine and scopolamine are hallucinogenic. Phenothiazines are used to treat LSD and amphetamine poisoning. Antihistamines have been misused to produce hallucinations. Freons (non-hallucinogenic) have caused 6 deaths, probably from

freezing damage to lung tissue, laryngeal spasm, or anoxia. Thus, the problems of treating the effects of hallucinogens have been compounded by the use of non-hallucinogens that may produce toxic, if not lethal, effects.

256. Verhulst, H. L., and Crotty, J. J.
GLUE-SNIFFING DETERRENT.
Bulletin of the National Clearinghouse for Poison Control Centers
(Washington), 4-5 (0 ref.), 1969.
E - intentional - gen. - gen. disc. - recom. - solvents - humans
B-2048.

Allylisothiocyanate, volatile oil of mustard, an additive in Testor plastic cement has proved an effective deterrent to glue sniffing. It irritates the nasal passages, sinuses, and eyes and is available to other manufacturers of intoxicating solvents. Substitute innocuous, symptomless solvents which did not alter the adhesive properties of glues could not be found.

257. Vervaeck, L.
ÉTHÉROMANIE ET SIMULATION. [Ether addiction and simulation].
Annales de Médecine Légale (Paris), 16: 65-67 (0 ref.), 1936.
F - intentional - gen. - case hist. - anesth. - humans - adults -
male - intent. inhal. - reg. use - depend. - impair. - deviant be-
hav. - police - hosp. A-1674.

A man was arrested for the theft of a bottle of ether. He had ordered it in a pharmacy and then, without paying for it, soaked his handkerchief and held it to his face. On the same day, he had already purchased and consumed 1/2 litre of the anesthetic. He claimed to have done it because of pains and lack of money. The inquiry established that this was not the first time that he was guilty of such an offence. The facts pointed to a case of ether addiction, but the accused denied being an addict. His hospital records showed that he had been admitted to different hospitals or psychiatric clinics nine times in the previous two years after being found in various stages of ether intoxication. On several occasions, the cause of admission was listed as "attempted suicide by ether". The patient declared that he had purposely brought about his hospitalization because of his inability to find work and lack of resources. The author discusses the evidence supporting this claim as well as the facts indicating an addiction, concluding that it remains an open question of whether this is a genuine case of ether addiction or merely an ingenious method for hospitalization

devised by an indolent psychopath.

258. Vliet, A. G. M. , van
EEN GEVAL VAN TOXISCHE PSYCHOSE BIJ TRICHHLOORETHY-
LEEN-ZUCHT. [A case of psychosis in trichloroethylene addiction].
Nederlands Tijdschrift voor Geneeskunde (Amsterdam), 103(2):
75-78 (15 ref.), 1959.
D - intentional - gen. - case hist. - solvents - humans - adults -
female - intent. inhal. - reg. use - disorient. - exhil. - hosp. -
urin. test - headache A-1675.

A discussion of the symptoms of acute and chronic poisoning by trichloroethylene is followed by the report of a 34 year old woman who was brought to the hospital in an acute state of excitement. For two weeks prior to her admission, she had been suffering from constantly worsening pains in the legs, arms, and neck, as well as experiencing severe muscle spasms. She had also complained of headaches and fatigue, was subject to inexplicable fits of weeping, and had the atactic symptoms of drunkenness. In the last two days, she was bed-ridden, could not eat, and did not recognize her surroundings. When she arrived at the hospital her condition was marked by severe motor unrest. She later became totally disoriented, and spent the night in a deep comatose state. The diagnosis was based on the detection of chlorinated hydrocarbon in the urine (1000 mg. per litre of trichloroacetic acid). Details of her treatment are given. The psychological investigation revealed that the patient's exaggerated attachment to her father had arrested her emotional development and precluded complete adult adaptation. The resulting unconscious conflicts were exposed and augmented by the aggressively hostile conduct of her mother, with whom she lived. However, she restrained her anger and resentment, lest she lose her mother. As the tensions grew, she sought a release through total escape into oblivion. The intoxication produced by trichloroethylene eased her guilt and allowed her to give free rein to her feelings of resentment and her ambivalent desires.

259. Voegelé, G. E. , and Dietze, H. J.
ADDICTION TO GASOLINE SMELLING IN JUVENILE DELIN-
QUENTS.
British Journal of Criminology (London), 4(1): 43-60 (20 ref.), 1963.
E - intentional - gen. - case hist. - gen. disc. - review - gas. -
humans - adoles. - male - accid. inhal. - intent. inhal. - anx. -
passiv. - pers. prob. - disorient. - euph. - hallu. - brok. home -
deviant behav. - rural - hosp. - EEG - ataxia - death - headache -

weak.

A-1676.

The action of fat soluble organic solvents, such as gasoline, is discussed with reference to the Meyer-Overtone theory of narcosis via effects on lipoids in membranes of nerve cells. Studies of toxicity of gasolines, according to composition, are quoted. It has an irritant as well as a narcotic effect. The author comments on Machle's review of gasoline intoxication. The acute brain syndrome is usually reversible but a chronic brain syndrome may ensue from repeated exposure. Literature on poisonings (usually accidental), and a few cases of addiction are reviewed. Some abnormal EEGs were reported. Hallucinations and sexual fantasies occur. Increased use for intoxication is predicted. Histories of two cases of gasoline addiction are presented. Both had schizoid features with one having homicidal and suicidal tendencies. Gasoline addicts present a psychosocial problem as many become delinquents. Well adjusted youths can indulge without becoming addicts. Pre-disposed persons are insecure and anxious, with a low frustration tolerance. This pattern was found related to disturbed family relations.

260. Wallace, P.

A PERSPECTIVE.

Juvenile Court Judges Journal (Chicago), 18(2): 44-45 (0 ref.),

1967.

E - intentional - gen. - gen. disc. - solvents - humans - adoles. - female - male - intent. inhal. - reg. use - euph. - legis. - police - death

B-2049.

Experimentation with intoxicants including opiates, alcohol, LSD, lighter fluid, and others has occurred for centuries. The current widespread problem of glue sniffing by juveniles is mentioned as an introduction to a description of the euphoric effects quoted by one boy who said that each experience was better than the last. State laws against use and sale of toxic solvents are mentioned. Hazards include deaths either while sniffing, or from resultant irresponsible behavior.

261. Wallace, P.

IT'S IN THE BAG BABY. GLUE SNIFFING AMONG JUVENILE DELINQUENTS AS REPORTED BY THE USERS THEMSELVES.

Paper presented at the Conference of the Continuing Institute on Non-Narcotic Drug Abuse at Southern Illinois University, May 15-20, 15 pp. (0 ref.),

1967.

E - intentional - gen. - gen. disc. - solvents - humans - adoles. -

female - male - intent. inhal. - reg. use - euph. - hallu. - low.
 class - legis. - police - death B-2050.

The glue sniffing habit continues to spread despite legislation focused on users and sales. There is more hope in new rehabilitative programs. Deaths have been associated with the effects of inhalation. Graphic accounts from two boys (between them inhaling up to 72 tubes per day) of the ritual, altered perceptions, stages of reaction, sexual response, and euphoria are quoted. Lighter fluid is said to give the same feeling, but only stronger. Both stopped voluntarily, one mainly due to the weird physical sensations. Most boys get started on glue by girls or older men. Fewer girls start, but they find it harder to stop. Depression was cited as a reason to return to the hallucinatory world of glue. The Denver Juvenile Court project findings in a nationwide survey are summarized: 90 percent are male; Negroes are the lowest percentage of offenders; mostly low income families; and 80 percent are involved in other delinquency. Glue sniffing and truancy, although self-defeating, are reactions of revenge against frustrations.

262. Weinraub, M., Groce, P., and Karno, M.
 CHLOROFORMISM - A NEW CASE OF A BAD OLD HABIT.
 California Medicine (San Francisco), 117(1): 63-65 (9 ref.), 1972.
 E - intentional - gen. - case hist. - anesth. - humans - adults -
 male - intent. inhal. - reg. use - hosp. - blood test - EEG - urin.
 test - vomit. B-2056.

The author mentions the literature concerning the "frolics", "sprees" and "jags" of those who used volatile anesthetics for pleasure and cites two references. A case is then reported of a 24 year old white enlisted man who wanted medical-psychiatric help in getting rid of his chloroform addiction. His past history was quite unremarkable but he began using chloroform at 17 years of age in a private boarding school. He showed no signs of psychosis, affective disorder, or deficiency in memory or thinking. Results of a complete physical examination were within limits. The patient was admitted for detoxification for three days and experienced mild cramping and paresthesias in his limbs. Follow-up contacts revealed that he had no desire to use chloroform.

263. Whelton, M. J.
 GLUE SNIFFING.
 British Medical Journal (London), 2: 1404 (1 ref.), 1962.
 E - intentional - lett. ed. - gen. disc. - solvents - humans -
 intent. inhal. - reg. use - peers A-1677.

Whelton writes that he encountered a number of glue sniffers in the accident room at Johns Hopkins Hospital, Baltimore, Md., in 1960-61. Many who had previously got their "kicks" from cough mixtures containing codeine found the "kick" from glue poor, but indulged "to be in the gang". The habit is well established in the U. S. A but it is hoped that asocial behavior of adolescents in Britain will not be expressed in a wave of this addiction.

264. Whitehead, P. C.

THE INCIDENCE OF DRUG USE AMONG HALIFAX ADOLESCENTS.

British Journal of Addiction (Oxford), 65: 159-165 (6 ref.), 1970.
E - intentional - experimental - res. pap. - solvents - humans -
adoles. - female - male - intent. inhal. - occas. use - reg. use
B-2086.

A survey was undertaken involving 1606 students attending grades 7, 9, 11, and 12 in the Metropolitan Halifax school system. A 25 percent random sample of the classes in each of the above four grades was chosen. The paper presented the incidence of use of the following drugs: tobacco, alcohol, marihuana, stimulants, tranquilizers, glue, barbiturates, LSD, other hallucinogens, and opiates for the whole sample and according to the grade and sex distribution of the respondents. Except for the use of tranquilizers, the boys had consistently higher rates of drug use than the girls. The largest total difference was in the use of alcohol while the boys' rate of use of "other hallucinogens" and for each of the three categories marihuana, barbiturates, and LSD were three times and twice that for the girls, respectively. A trend of drug use was noticed as the rates of use increased from grade 7 to grade 11 and then decreased in grade 12. The only exceptions to this trend were the use of marihuana which continued to increase in grade 12 and the use of glue which peaked in grade 9. The use of glue ranked eighth for the boys and sixth for the girls suggesting that the boys preferred barbiturates and "other hallucinogens" to glue while the girls preferred glue over the former two groups of drugs. The results make it quite apparent that the use of glue is favored by the young, ranking third of the most frequently used drug in the 7th grade, peaking to 5.18 percent in grade 9, and not mentioned by those in the 12th grade.

265. Wichern, H.

UEBER BENZINVERGIFTUNG. [On benzene poisoning].

Muenchener Medizinische Wochenschrift (Munich), 56: 11-13
(20 ref.),

1909.

G - intentional - gen. - case hist. - review - solvents - humans - child. - adults - accid. inhal. - intent. inhal. - acute dos. - reg. use - depend. A-1678.

A brief clarification of the nature and forms of benzene in common use is followed by reports of five cases (3 instances from oral ingestion and in the others from inhalation) in which the accidental intake of the substance resulted in acute poisoning. The author then looks at the question of habituation to and chronic poisoning by benzene vapors and finds that, on the basis of experimental animal studies and cited cases of intentional inhalation, the possibility of both reactions exists. He therefore concludes that precautionary measures must be taken in industry whenever workers run the risk of exposure to the toxic fumes.

266. Wilson, R.
SUMMARY OF DISCUSSION FROM WORKSHOP "D".
In: A Conference: Inhalation of Glue Fumes and Other Substance Abuse Practices Among Adolescents. Denver: U. S. Department of Health, Education, and Welfare, 136-138 (0 ref.), 1967.
E - intentional - report - recom. - solvents - humans - cult. dep-riv. - low. class - couns. B-2051.

Only a change in the attitudes and social perceptions of children can alter the symptom of substance abuse. It must be handled at the level of the child, family, and the community. As it is forces in the community that produce the destructive negative self-image and passivity, these must be counteracted by providing ego reinforcement, a strong father image, and success experiences. The meaning of success for each child must be determined. Glue sniffing is a way of escape for minority and have-not groups.

267. Winek, C. L., Collom, W. D., and Wecht, C. H.
FATAL BENZENE EXPOSURE BY GLUE-SNIFFING.
Lancet (London), 1(7491): 683 (0 ref.), 1967.
E - intentional - lett. ed. - case hist. - solvents - humans - adoles. - male - intent. inhal. - autop. - resp. syst. - death B-2053.

A letter reports the death of a 16 year old Caucasian male who had inhaled rubber cement fumes containing benzene. At autopsy, 94 μ g. of benzene per 100 ml. of blood and 0.55 mg. per 100 gm. of kidney were found. Cerebral and acute pulmonary edema, and congestion of the spleen, liver, and the mucosal surfaces of the stomach and the duodenum were evident. The increasing number of deaths in the U. S. A. from glue sniffing is mentioned. Most glues contain

toluene (methyl benzene) of a technical grade and benzene is found in a low percentage of these glues. Benzene has an anesthetic effect and may cause death from respiratory failure.

268. Winek, C. L., Wecht, C. H., and Collom, W. D.
TOLUENE FATALITY FROM GLUE SNIFFING.
Pennsylvania Medicine (Harrisburg), 71: 81 (5 ref.), 1968.
E - intentional - gen. - case hist. - solvents - humans - adoles. -
male - intent. inhal. - metabolism - euph. - autop. - blood test -
kid., liv. - death B-2055.

Greater difficulty is noted in identifying the toxic agent in emergencies following juvenile intoxication than in industrial exposures. An array of ingested and inhaled toxicants are listed. Measurement of hippuric acid in urine may aid diagnosis of glue sniffing as it is the end product in the metabolism of toluene. The death of a 13 year old Caucasian male is reported. He was narcotized by the toluene in airplane cement and then asphyxiated in his plastic bag. The glue sniffing fad has caused other deaths due to benzene contamination, or plastic bag asphyxiation. The liver was dark red brown and congested. All other organs were unremarkable. The concentration of toluene in the blood and tissues are given. Toluene has been said by H. W. Gerarde to be more powerfully narcotic and more acutely toxic than benzene. Threshold limit values of 200 ppm. for toluene and 25 ppm. for benzene are reported.

269. Winek, C. L.
DISCOURAGING DRUG ABUSE.
New England Journal of Medicine (Boston), 281(13): 740 (0 ref.), 1969.
E - intentional - lett. cd. - gen. disc. - recom. - solvents -
humans - adoles. - intent. inhal. - death B-2054.

A letter reports the deaths of 5 youths in Allegheny County from the inhalation of glue and commends the addition of the irritant, oil of mustard, to glue. Winek suggests addition of the emetic ipecac to cough syrups, to prevent abuse, and to barbiturates, to save lives by inducing vomiting after suicidal overdoses.

270. Winick, C.
TEEN-AGE GLUE SNIFFERS REPORTED IN MANY AREAS.
Social Health News (New York), 37(9): 1-2 (0 ref.), 1962.
E - intentional - gen. - gen. disc. - solvents - humans - child. -
adoles. - intent. inhal. - reg. use - depend. - impair. - detect. -

ataxia - tinnitus

A-1679.

A glue sniffing fad, since 1960, among juveniles (8 years to early adolescence) has been noted in medical journals considering its effects on physical and emotional health. Easy access, and easy substitution of other organic solvents with the same effect makes legislation pointless. This new source of "kicks" seems to substitute the use of gasoline and other solvents previously used to seek artificial heightening of sensation. Ear buzzing, difficulties in vision, and unconsciousness occur. Serious damage to vital organs has been reported. It is too early to say whether this is related to later use of more dangerous drugs.

271. Winick, C., and Goldstein, J.
 THE GLUE SNIFFING PROBLEM.
 New York, New York: The American Social Health Association,
 22 pp. (26 ref.), 1965.
 E - intentional - gen. - gen. disc. - solvents - humans - adoles. -
 male - desc. admin. - intent. inhal. - reg. use - toler. - anx. -
 passiv. - depend. - hallu. - impair. - cult. depriv. - deviant be-
 hav. - peers - police - hosp. - tinnitus B-2052.

A sharp increase is reported in the incidence of glue sniffing in the U. S. A. since 1960. Other volatile products offering "kicks" and methods of use are described. Effects resemble alcohol intoxication. Hallucinations, self-destructive, reckless, or aggressive behavior, and amnesia sometimes occur. Tolerance and psychological dependence develop. Glue does not seem to be physiologically addictive, but may have replaced marihuana as the precursor to heroin use. Graduation to other narcotics seems to depend more on personality predisposition than on the specific substance abused. Accidental sniffers, who can stop, are distinguished from hard core ones who have many of the personality features of alcoholics and drug addicts. The initial motive may be peer group approval, but then other personality needs are satisfied. Glue may provide a passive retreat and indirect sexual satisfaction where there is a lack of normal sexual interest. Emotional deprivation in broken homes is common. Methods of prevention, and medical and psychological treatment are discussed.

272. Wintle, F. T.
 ETHERIZATION.
 Lancet (London), 1: 162-163 (0 ref.), 1847.
 E - intentional - lett. ed. - gen. disc. - anesth. - humans - in-
 tent. inhal. - reg. use - brain - tremors A-1680.

A letter describes a case of cerebral derangement after repeated inhalation of ether. He was under the delusion that he could expand his mind ad infinitum. Wintle cautions against the use of ether for subjects predisposed to mental excitement.

273. Wyld, G.

ON CERTAIN PSYCHOLOGICAL PHENOMENA ACCOMPANYING
THE ADMINISTRATION OF ANAESTHETICS.

Lancet (London), 1: 776 (0 ref.),

1895.

E - intentional - lett. ed. - gen. disc. - anesth. - humans - hallu.

A-1681.

Transcendental visions and philosophical insights experienced by Sir William Davey after inhaling nitrous oxide and by the author, colleagues, and patients after inhaling chloroform are described. These insights are similar to those experienced by people close to drowning. A study of the psychological effects of anesthetics is urged. Valuable psychological facts might be learned.

APPENDIX: Related Citations

A list of citations of articles dealing with accidental overexposure, experimental toxicity studies and other pertinent aspects of solvents.

1. Adams, E. M. , Spencer, H. C. , Rowe, V. K. , McCollister, D. D. , and Irish, D. D.
VAPOR TOXICITY OF TRICHLOROETHYLENE DETERMINED BY EXPERIMENTS ON LABORATORY ANIMALS.
A. M. A. Archives of Industrial Health (Chicago), 4: 469-481
(13 ref.), 1951.
E - experimental - res. pap. - recom. - solvents - mammals - female - male - desc. admin. - exper. inhal. - acute dos. - chron. dos. - toxicol. - autop. - blood test - urin. test - cardiovasc. syst. - CNS - kid. , liv. - resp. syst. - death A-1682.
2. Adams, W. L.
THE DETERMINATION OF CHLORAL HYDRATE, CHLOROFORM, AND RELATED SUBSTANCES IN BLOOD.
Journal of Pharmacology and Experimental Therapeutics (Baltimore), 74: 11-17 (9 ref.), 1942.
E - experimental - res. pap. - anesth. - blood test A-1683.
3. Aidin, R.
PETROL-VAPOUR POISONING.
British Medical Journal (London), 2(5092): 369-370 (10 ref.), 1958.
E - accidental - gen. - case hist. - gas. - humans - adoles. - male - accid. inhal. - acute dos. - autop. - CNS - resp. syst. - death A-1684.
4. Ainsworth, R. W.
PETROL-VAPOUR POISONING.
British Medical Journal (London), 1(5185): 1547-1548 (4 ref.), 1960.
E - accidental - gen. - case hist. - gas. - humans - child. - male - accid. inhal. - acute dos. - autop. - brain - kid. , liv. - resp. syst. - anemia - ataxia - death A-1685.
5. Albrecht
UNTER DEM BILDE EINES HIRNTUMORS VERLAUFENDE CHRONISCHE BENZOLINTOXIKATION. [Chronic benzol intoxication resembling the symptoms of a brain tumor].
Monatsschrift für Psychiatrie und Neurologie (Basel), 82: 108-112 (0 ref.), 1932.
G - accidental - gen. - case hist. - solvents - humans - adults - male - accid. inhal. - chron. dos. - impair. - hosp. - brain - dizz. - headache - vomit. A-1686.

6. Andersen, P., and Kaada, B. R.
THE ELECTROENCEPHALOGRAM IN POISONING BY LACQUER
THINNER (BUTYL ACETATE AND TOLUENE).
Acta Pharmacologica et Toxicologica (Copenhagen), 9: 125-130
(11 ref.), 1953.
E - experimental - res. pap. - solvents - humans - mammals -
adults - desc. admin. - exper. inhal. - acute dos. - chron. dos. -
EEG - dizz. - nausea A-1687.
7. Anonymous
AN ANESTHETIST'S FATAL EXPERIMENT ON HIMSELF.
Journal of the American Medical Association (Chicago), 89: 1347
(0 ref.), 1927.
E - accidental - edit. - case hist. - anesth. - humans - adults -
male - intent. inhal. - acute dos. - death A-1689.
8. Anonymous
CARBON-TETRACHLORIDE FIRE-EXTINGUISHERS.
Lancet (London), 1: 57 (0 ref.), 1961.
E - accidental - edit. - gen. disc. - solvents - humans - accid. in-
hal. - chem. A-1691.
9. Anonymous
SUICIDE BY CHLOROFORM.
Lancet (London), 1: 23 (0 ref.), 1860.
E - intentional - edit. - gen. disc. - anesth. - humans - intent. in-
hal. - acute dos. - death A-1688.
10. Anonymous
TOXICITY OF ETHYLENE DICHLORIDE AND OF TRICHLOR-
ETHYLENE.
Journal of the American Medical Association (Chicago), 102(15):
1250 (0 ref.), 1934.
E - accidental - anon. - gen. - solvents - chron. dos. - toxicol. -
kid., liv. - headache - nausea A-1690.
11. Ashe, W. F., and Sailer, S.
FATAL UREMIA FOLLOWING SINGLE EXPOSURE TO CARBON
TETRACHLORIDE FUMES.
Ohio State Medical Journal (Columbus), 38(6): 553-555 (0 ref.),
1942.
E - accidental - gen. - case hist. - solvents - humans - adults -

male - accid. inhal. - acute dos. - impair. - hosp. - autop. -
blood test - urin. test - kid., liv. - resp. syst. - death - nausea -
urin. path. - vomit. A-1692.

12. Azar, A., Zapp, J. A., Jr., Reinhardt, C. F., and Stopps, G. J.
CARDIAC TOXICITY OF AEROSOL PROPELLANTS.
Journal of the American Medical Association (Chicago), 215(9):
1501-1502 (18 ref.), 1971.
E - experimental - lett. ed. - solvents - mammals - exper. inhal.
- acute dos. - toxicol. - cardiovasc. syst. - death B-2061.
13. Baker, A. B., and Tichy, F. Y.
THE EFFECTS OF THE ORGANIC SOLVENTS AND INDUSTRIAL
POISONINGS ON THE CENTRAL NERVOUS SYSTEM.
Research Publications. Association for Research in Nervous and
Mental Disease (Baltimore), 32: 475-505 (62 ref.), 1953.
E - accidental - gen. - review - solvents - mammals - exper. inhal.
- acute dos. - chron. dos. - toxicol. - disorient. - impair. - autop.
- bone mar. - CNS - kid., liv. - resp. syst. - ataxia - death -
nausea - vomit. A-1693.
14. Baker, H. M.
INTOXICATION WITH COMMERCIAL METHYL CHLORIDE.
Journal of the American Medical Association (Chicago), 88(15):
1137-1138 (2 ref.), 1927.
E - accidental - gen. - case hist. - review - solvents - humans -
adults - male - accid. inhal. - acute dos. - metabolism - toxicol. -
hosp. - blood test - urin. test - ataxia - dizz. - nausea A-1694.
15. Baker, K. C., and White, C. J.
AN OCCUPATIONAL DERMATITIS DUE TO THE INHALATION OF
TRICHLORETHYLENE GAS.
Industrial Medicine (Chicago), 15(6): 389 (5 ref.), 1946.
E - accidental - gen. - case hist. - solvents - humans - adults -
male - accid. inhal. - chron. dos. - hosp. - biopsy - urin. test
A-1695.
16. Barrett, H. M.
THE DETERMINATION OF TRICHLORETHYLENE IN AIR.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.),
18(6): 341-348 (5 ref.), 1936.
E - experimental - gen. - recom. - solvents A-1696.

17. Barrett, H. M. , MacLean, D. L. , and Cunningham, J. G.
A COMPARISON OF THE TOXICITY OF CARBON TETRACHLORIDE AND TRICHLOROETHYLENE.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.),
20(5): 360-379 (30 ref.), 1938.
E - experimental - res. pap. - review - solvents - mammals - exper. inhal. - chron. dos. - toxicol. - impair. - autop. - death
A-1697.

18. Bartoníček, V.
METABOLISM AND EXCRETION OF TRICHLOROETHYLENE AFTER INHALATION BY HUMAN SUBJECTS.
British Journal of Industrial Medicine (London), 19: 134-141 (28 ref.), 1962.
E - experimental - res. pap. - solvents - humans - adults - female - male - exper. inhal. - acute dos. - metabolism - blood test - urin. test
A-1698.

19. Batchelor, J. J.
THE RELATIVE TOXICITY OF BENZOL AND ITS HIGHER HOMOLOGUES.
American Journal of Hygiene (Baltimore), 7: 276-298 (17 ref.), 1927.
E - experimental - res. pap. - review - solvents - mammals - exper. inhal. - acute dos. - chron. dos. - toxicol. - autop. - blood test - bone mar. - CNS
A-1699.

20. Bock, E. , and Vyskočil, J.
REVERSIBILNÍ HEMIPARESA PŘI POKUSU O SEBEVRAŽDU TRICHLOROETHYLENEM. [Reversible hemiparesis in attempted suicide with trichloroethylene by inhalation].
Lékařské Listy (Prague), 9(15-16): 353-355 (11 ref.), 1954.
C - intentional - gen. - case hist. - solvents - humans - adoles. - female - intent. inhal. - acute dos. - metabolism - toxicol. - impair. - urin. test - CNS
A-1701.

21. Boje, H. , Benkel, W. , and Heiniger, H. J.
UNTERSUCHUNGEN ZUR LEUKOPOESE IM KNOCHENMARK DER RATTE NACH CHRONISCHER BENZOL-INHALATION. [Studies on leucopoiesis in the bone marrow of the rat after chronic benzene inhalation].
Blut (Munich), 21(4): 250-257 (12 ref.), 1970.
G - experimental - res. pap. - solvents - mammals - female -

exper. inhal. - chron. dos. - blood test - bone mar. - anemia

B-2070.

22. Bonnichsen, R., Maehly, A. C., and Moeller, M.
POISONING BY VOLATILE COMPOUNDS. I. AROMATIC HYDROCARBONS.
Journal of Forensic Sciences (Mundelein, Ill.), 11(2): 186-204
(20 ref.), 1966.
E - experimental - res. pap. - case hist. - review - gas. - solvents - humans - child. - adoles. - adults - female - male - accid. inhal. - intent. inhal. - acute dos. - chem. - metabolism - toxicol. - autops. - blood test - chromatog. - urin. test - death B-2071.
23. Bonnichsen, R., and Maehly, A. C.
POISONING BY VOLATILE COMPOUNDS. II. CHLORINATED ALIPHATIC HYDROCARBONS.
Journal of Forensic Sciences (Mundelein, Ill.), 11(3): 414-427
(11 ref.), 1966.
E - experimental - res. pap. - review - anesth. - solvents - humans - adoles. - adults - female - male - accid. inhal. - intent. inhal. - acute dos. - metabolism - toxicol. - autops. - blood test - chromatog. - urin. test - death B-2072.
24. Bowditch, M., and Elkins, H. B.
CHRONIC EXPOSURE TO BENZENE (BENZOL). I. THE INDUSTRIAL ASPECTS.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.), 21(8): 321-330 (10 ref.), 1939.
E - experimental - res. pap. - solvents - humans - adults - male - accid. inhal. - chron. dos. - urin. test - death A-1702.
25. Boyd, P. R., Walker, G., and Henderson, I. N.
THE TREATMENT OF TETRAETHYL LEAD POISONING.
Lancet (London), 1: 181-185 (22 ref.), 1957.
E - accidental - gen. - case hist. - gas. - humans - adults - male - accid. inhal. - chron. dos. - hallu. - impair. - trans. prob. - hosp. - blood test - EEG - urin. test - CNS - headache - tremors - vomit. A-1703.

26. Brenner, C.
NOTE ON THE ACTION OF DICHLORO-DIFLUORO-METHANE
ON THE NERVOUS SYSTEM OF THE CAT.
Journal of Pharmacology and Experimental Therapeutics (Baltimore),
59: 176-181 (3 ref.), 1937.
E - experimental - res. pap. - mammals - adults - exper. inhal.
- acute dos. - toxicol. - CNS - tremors A-1704.
27. Burgison, R. M. , O'Malley, W. E. , Heisse, C. K. , Forrest, J. W. ,
and Krantz, J. C. , Jr.
ANESTHESIA. XLVI. FLUORINATED ETHYLENES AND CAR-
DIAC ARRHYTHMIAS INDUCED BY EPINEPHRINE.
Journal of Pharmacology and Experimental Therapeutics (Baltimore),
114: 470-472 (7 ref.), 1955.
E - experimental - res. pap. - anesth. - mammals - exper. inhal.
- acute dos. - cardiovasc. syst. A-1705.
28. Butler, T. C.
METABOLIC TRANSFORMATIONS OF TRICHLOROETHYLENE.
Journal of Pharmacology and Experimental Therapeutics (Baltimore),
97: 84-92 (13 ref.), 1949.
E - experimental - res. pap. - solvents - mammals - exper. inhal.
- acute dos. - metabolism - urin. test A-1706.
29. Byczkowska, Z.
ZATRUCIA TRÓJCHLOROETYLENEM. [Poisoning by trichloro-
ethylene].
Medycyna Pracy (Lodz), 8(3): 191-203 (43 ref.), 1957.
Po - experimental - gen. - case hist. - review - solvents - humans
- mammals - acute dos. - chron. dos. - chem. - pharmacol. -
toxicol. - impair. - brain - cardiovasc. syst. - kid., liv. - resp.
syst. - death - headache - nausea - vomit. - weak. A-1707.
30. Carpenter, C. P. , Smyth, H. F. , Jr. , and Pozzani, U. C.
THE ASSAY OF ACUTE VAPOR TOXICITY, AND THE GRADING
AND INTERPRETATION OF RESULTS ON 96 CHEMICAL COM-
POUNDS.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.),
31: 343-346 (3 ref.), 1949.
E - experimental - res. pap. - solvents - mammals - desc. admin.
- exper. inhal. - acute dos. - toxicol. - autop. - death A-1708.

31. Chenoweth, M. B.
VENTRICULAR FIBRILLATION INDUCED BY HYDROCARBONS
AND EPINEPHRINE.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.),
28(4): 151-158 (16 ref.), 1946.
E - experimental - res. pap. - review - gas. - solvents - mam-
mals - desc. admin. - exper. inhal. - acute dos. - toxicol. - car-
diovasc. syst. - death A-1709.
32. Cherkin, A.
PARNASSUS REVISITED.
Science (Washington), 155: 266, 268 (1 ref.), 1967.
E - experimental - gen. - gen. disc. - anesth. - humans - intent.
inhal. B-2075.
33. Chloroform Committee of the Royal Medical and Chirurgical
Society.
USES AND THE PHYSIOLOGICAL, THERAPEUTICAL, AND
TOXICAL EFFECTS OF CHLOROFORM.
Royal Medical and Chirurgical Society of London. Medico-chirur-
gical Transactions (London), 47: 323-442 (159 ref.), 1864.
E - experimental - res. pap. - case hist. - review - anesth. -
humans - mammals - adults - desc. admin. - accid. inhal. - exper.
inhal. - intent. inhal. - acute dos. - chron. dos. - toxicol. - de-
pend. - impair. - hosp. - autop. - cardiovasc. syst. - resp. syst.
- death A-1710.
34. Choy, T., and Parkhouse, J.
LABORATORY STUDIES OF INHALATION ANAESTHETICS.
British Journal of Anaesthesia (Manchester), 41: 827-833 (13 ref.),
1969.
E - experimental - res. pap. - anesth. - solvents - humans -
adults - exper. inhal. - acute dos. - psych. test B-2076.
35. Clayton, J. W., Jr.
FLUOROCARBON TOXICITY AND BIOLOGICAL ACTION.
Fluorine Chemistry Reviews (New York), 1(2): 197-252 (57 ref.),
1967.
E - experimental - review - solvents - mammals - exper. inhal. -
chem. - pharmacol. - toxicol. B-2077.

36. Clinton, M. , Jr.
 RENAL INJURY FOLLOWING EXPOSURE TO CARBON TETRA-
 CHLORIDE.
 New England Journal of Medicine (Boston), 237(6): 183-185 (17 ref.),
 1947.
 E - accidental - gen. - case hist. - solvents - humans - adults -
 male - accid. inhal. - acute dos. - pharmacol. - blood test - urin.
 test - cardiovasc. syst. - kid. , liv. - dizz. - headache - nausea -
 urin. path. - vomit. - weak. A-1711.

37. Clinton, M. , Jr.
 TOXIC EFFECTS OF GASES AND VAPORS. MECHANISM OF
 POISONING BY VOLATILE SOLVENTS.
 New England Journal of Medicine (Boston), 238(2): 51-54 (6 ref.),
 1948.
 E - accidental - experimental - gen. - gen. disc. - solvents - hu-
 mans - accid. inhal. - exper. inhal. - acut dos. - chem. - phar-
 macol. - bone mar. - kid. , liv. - resp. syst. - urin. path. A-1712.

38. Cohen, H. P. , Cohen, M. M. , Lin, S. , and Baker, A. B.
 TISSUE LEVELS OF TRICHLOROETHYLENE AFTER ACUTE
 OR CHRONIC EXPOSURE.
 Anesthesiology (Philadelphia), 19(2): 188-196 (13 ref.), 1958.
 E - experimental - res. pap. - solvents - mammals - desc. admin.
 - acute dos. - chron. dos. - metabolism - toxicol. - blood test -
 death A-1713.

39. Collier, H.
 METHYLENE DICHLORIDE INTOXICATION IN INDUSTRY. A
 REPORT OF TWO CASES.
 Lancet (London), 2: 594-595 (2 ref.), 1936.
 E - accidental - gen. - case hist. - solvents - humans - adults -
 male - accid. inhal. - acute dos. - hosp. - urin. test - CNS -
 anemia - dizz. - headache A-1714.

40. Corcoran, A. C. , Taylor, R. D. , and Page, I. H.
 ACUTE TOXIC NEPHROSIS.
 Journal of the American Medical Association (Chicago), 123(2):
 81-85 (26 ref.), 1943.
 E - accidental - experimental - res. pap. - solvents - humans -
 adults - male - accid. inhal. - acute dos. - pharmacol. - toxicol.
 - hosp. - blood test - urin. test - CNS - headache - nausea - urin.
 path. - vomit. - weak. A-1715.

41. Cotter, L. H.
TRICHLOROETHYLENE POISONING.
A. M. A. Archives of Industrial Hygiene and Occupational Medicine
(Chicago), 1: 319-322 1950.
E - accidental - gen. - case hist. - solvents - humans - adults -
male - accid. inhal. - acute dos. - impair. - hosp. - blood test -
urin. test - CNS - kid. , liv. - dizz. - headache - nausea - vomit.
A-1716.
42. Courtin, R. F.
ELECTROENCEPHALOGRAPHIC AND CLINICAL OBSERVATIONS
WITH TRICHLOROETHYLENE AND NITROUS OXIDE ANESTHESIA.
Dallas Medical Journal (Dallas), 41: 613-618 (20 ref.), 1955.
E - experimental - res. pap. - gen. disc. - recom. - review -
anesth. - solvents - humans - adults - exper. inhal. - acute dos. -
impair. - EEG A-1717.
43. Courville, C. B.
FORENSIC NEUROPATHOLOGY. XI. THE ASPHYXIAL GASES.
Journal of Forensic Sciences (Mundelein), 9(1): 19-46 (46 ref.),
1964.
E - accidental - gen. - case hist. - gen. disc. - review - anesth. -
solvents - humans - accid. inhal. - acute dos. - chron. dos. -
pharmacol. - toxicol. - hosp. - cardiovasc. syst. - CNS - nerv.
syst. - resp. syst. - death - dizz. A-1718.
44. Curry, A. S. , Hurst, G. , Kent, N. R. , and Powell, H.
RAPID SCREENING OF BLOOD SAMPLES FOR VOLATILE
POISONS BY GAS CHROMATOGRAPHY.
Nature (London), 195(4841): 603-604 (2 ref.), 1962.
E - experimental - gen. - recom. - anesth. - solvents - chroma-
tog. A-1719.
45. Cutler, J. T.
THE ACCUMULATION OF GUANIDINE IN THE BLOOD FOLLOW-
ING ACUTE LIVE INJURY BY CARBON TETRACHLORIDE ,
CHLOROFORM, ARSENIC OR PHOSPHORUS.
Journal of Pharmacology and Experimental Therapeutics (Baltimore),
41: 337-345 (14 ref.), 1931.
E - experimental - res. pap. - anesth. - mammals - exper. inhal.
- acute dos. - blood test - cardiovasc. syst. - kid. , liv. A-1720.

46. Dautrebande, L. , Alloza Feced, J. , Philippot, E. , Charlier, R. ,
and Bodson, M. -T.
PARALYSIE DU SYSTÈME VASOMOTEUR PAR LES VAPEURS
D'ACÉTATE D'AMYLE ET DE VERNIS DIT CELLULOSIQUE.
[Paralysis of the vasomotor system by amyl acetate and cellulose
varnish vapors].
C. R. de la Société de Biologie (Paris), 119: 314-316 (5 ref.), 1935.
F - experimental - res. pap. - solvents - mammals - exper. inhal.
- acute dos. - toxicol. - cardiovasc. syst. A-1721.

47. Davidson, B. M.
STUDIES OF INTOXICATION. V. THE ACTION OF ETHYL
CHLORIDE.
Journal of Pharmacology and Experimental Therapeutics (Baltimore),
26: 37-42 (0 ref.), 1925.
E - experimental - res. pap. - solvents - humans - exper. inhal. -
acute dos. - impair. - psych. test - nausea - vomit. A-1722.

48. Davies, N. E.
JET FUEL INTOXICATION.
Aerospace Medicine (Baltimore), 35(5): 481-482 (6 ref.), 1964.
E - accidental - gen. - case hist. - gas. - humans - adults - male
- accid. inhal. - acute dos. - euph. - resp. syst. - headache -
nausea - weak. A-1723.

49. Davis, A. , Schafer, L. J. , and Bell, Z. G.
THE EFFECTS ON HUMAN VOLUNTEERS OF EXPOSURE TO
AIR CONTAINING GASOLINE VAPOR.
Archives of Environmental Health (Chicago), 1: 548-554 (3 ref.),
1960.
E - experimental - res. pap. - gas. - humans - adults - male -
desc. admin. - exper. inhal. - acute dos. - nerv. syst. A-1724.

50. Davis, P. A.
CARBON TETRACHLORIDE AS AN INDUSTRIAL HAZARD.
Journal of the American Medical Association (Chicago), 103(13):
963-966 (0 ref.), 1934.
E - experimental - res. pap. - solvents - humans - mammals -
adoles. - adults - desc. admin. - exper. inhal. - acute dos. -
chem. - impair. - autop. - urin. test - CNS - kid. , liv. - resp.
syst. - anemia - death - headache - nausea - vomit. A-1725.

51. Defalque, R. J.
PHARMACOLOGY AND TOXICOLOGY OF TRICHLOROETHYLENE.
A CRITICAL REVIEW OF THE WORLD LITERATURE.
Clinical Pharmacology and Therapeutics (St. Louis), 2(5): 665-
(424 ref.), 1961.
E - experimental - gen. - review - anesth. - solvents - exper. in-
hal. - acute dos. - chron. dos. - pharmacol. - toxicol. - euph. -
kid. , liv. - ataxia - death - nausea - vomit. A-1726.
52. Desnoyers, Y.
COMPLICATIONS DE L'INHALOTHÉRAPIE. [Hazards of inhala-
tion therapy].
Union Médicale du Canada (Montreal), 99(10): 1885-1888 (24 ref.),
1970.
F - accidental - gen. - review - anesth. - humans - acute dos. -
cardiovasc. syst. - CNS - resp. syst. B-2074.
53. Dillon, J. B.
TRICHLOROETHYLENE FOR THE REDUCTION OF PAIN ASSO-
CIATED WITH MALIGNANT DISEASE.
Anesthesiology (Philadelphia), 17: 208-209 (2 ref.), 1956.
E - experimental - gen. - case hist. - recom. - solvents - humans
- adults - female - reg. use A-1727.
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and Conolly, M. E.
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weak. A-1733.
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hal. - legis. - cardiovasc. syst. - CNS - kid. , liv. - resp. syst. -
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male - chron. dos. - hosp. - autop. - urin. test - cardiovasc.
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test - bone mar. - cardiovasc. syst. - anemia - death - dizz. -
headache - weak. A-1740.
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nausea

A-1749.

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- depend. A-1751.
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male - accid. inhal. - acute dos. - metabolism - biopsy - urin.
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vomit. B-2102.

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min. - exper. inhal. - chem. - metabolism - blood test - urin.
test A-1754.
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adults - female - male - toxicol. - autop. - blood test - chroma-
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death A-1755.
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A-1756.

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 E - accidental - gen. - case hist. - solvents - humans -adults -
 male - accid. inhal. - acute dos. - chron. dos. - hosp. - blood
 test - urin. test - kid. , liv. - dizz. - headache - nausea - vomit.
 A-1757.

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 nausea - vomit. - weak. A-1758.

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syst. - death A-1760.

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urin. path. - vomit. A-1761.

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adoles. - adults - female - male - intent. inhal. - occas. use -
reg. use - psych. test B-2105.

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psych. test B-2106.

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B-2107.

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death A-1763.
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death A-1764.
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test - urin. test - kid., liv. - dizz. - headache - nausea - weak.
A-1765.
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death - dizz. - headache - nausea - vomit. A-1766.

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hal. - acute dos. - kid. , liv. - death - nausea - urin. path. -
vomit. A-1767.
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liv. - death - dizz. A-1768.
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child. - adoles. - adults - female - male - hosp. - autop. - blood
test - urin. test - kid. , liv. - resp. syst. - death - dizz. - head-
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A-1770.

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blood test - urin. test A-1772.
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chloroethylene (tri) poisoning, with special reference to chemical
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hal. - acute dos. - impair. A-1821.
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chromatog. B-2127.
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accid. inhal. - acute dos. - death B-2128.
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- exper. inhal. - acute dos. - chron. dos. - metabolism - autop. -
blood test - urin. test - bone mar. A-1823.

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- toxicol. - autop. - kid. , liv. A-1824.
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accid. inhal. - blood test - bone mar. - nerv. syst. - death
A-1825.
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anemia - nausea - vomit. A-1826.
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TOXIC EFFECTS OF METHYL CHLORIDE GAS.
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- male - toxicol. - nausea - tremors - vomit. A-1827.
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OACETYLENE MIXTURES.
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death B-2130.

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mammals - card. arrhy. B-2131.

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British Journal of Industrial Medicine (London), 23: 249-262
(238 ref.), 1966.
E - experimental - gen. - gen. disc. - review - solvents - accid.
inhal. - acute dos. - chron. dos. - chem. - metabolism - toxicol.
- CNS - kid. , liv. - headache - nausea - vomit. B-2132.

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CHLORETHYLENE.
Ergonomics (London), 13(5): 580-586 (24 ref.), 1970.
E - experimental - res. pap. - solvents - humans - female - male
- accid. inhal. - chron. dos. - psych. test - urin. test - CNS -
nerv. syst. - dizz. - headache - nausea - vomit. B-2133.

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dos. - blood test - urin. test - death A-1828.

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RELATED COMPOUNDS.
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- kid. , liv. - resp. syst. - anemia - death A-1829.
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accid. inhal. - exper. inhal. - chron. dos. - toxicol. - autop. -
A-1831.
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- male - exper. inhal. - acute dos. - metabolism - urin. test
A-1832.
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FROM ASTHMA.
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adoles. - adults - female - male - intent. inhal. - autop. - resp.
syst. - death B-2134.

201. Sterner, J. H.
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TO A VARIED ORGANIC CHEMICAL EXPOSURE.
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hal. - toxicol. A-1833.
202. Stewart, A. , and Witts, L. J.
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1944.
E - experimental - res. pap. - solvents - humans - female - male
- accid. inhal. - chron. dos. - blood test - brain - kid. , liv. -
dizz. - headache - nausea - vomit. - weak. A-1834.
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ACCIDENTAL VAPOR EXPOSURE TO ANESTHETIC CONCEN-
TRATIONS OF A SOLVENT CONTAINING TETRACHLORO-
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adults - male - accid. inhal. - acute dos. - impair. - blood test -
urin. test - kid. , liv. A-1835.
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exper. inhal. - acute dos. - blood test - urin. test A-1836.
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acute dos. - metabolism - blood test A-1837.

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- metabolism - toxicol. - CNS - headache A-1838.
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- adoles. - male - accid. inhal. - acute dos. - CNS - dizz. -
nausea - weak. B-2135.
208. Stewart, R. D.
ACUTE TETRACHLOROETHYLENE INTOXICATION.
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1490-1492 (15 ref.), 1969.
E - accidental - gen. - case hist. - solvents - humans - adults -
male - accid. inhal. - acute dos. - impair. - CNS - kid. , liv.
B-2136.
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Rowe, V. K.
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FORM VAPOR.
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1969.
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- desc. admin. - exper. inhal. - chron. dos. - blood test - urin.
test - headache B-2137.
210. Stewart, R. D. , Baretta, E. D. , Dodd, H. C. , and Torkelson, T. R.
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ETHYLENE.
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- exper. inhal. - acute dos. - chron. dos. - blood test - headache
B-2138.

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EXPERIMENTAL HUMAN EXPOSURE TO VAPOR OF PROPYLENE GLYCOL MONOMETHYL ETHER.
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- desc. admin. - exper. inhal. - acute dos. - blood test - psych.
test - CNS - nausea B-2139.
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METHYL CHLOROFORM INTOXICATION. DIAGNOSIS AND
TREATMENT.
Journal of the American Medical Association (Chicago), 215(11):
1789-1792 (16 ref.), 1971.
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male - accid. inhal. - acute dos. - urin. test - CNS - resp. syst. -
dizz. - nausea - vomit. B-2140.
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liv. - resp. syst. - death - headache - nausea - urin. path. -
vomit. A-1839.
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admin. - exper. inhal. - acute dos. - blood test - psych. test -
urin. test B-2141.
215. Svirbely, J. L. , Dunn, R. C. , and Oettingen, W. F. , von
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liv. - resp. syst. - death A-1840.

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N WERKTÄTIGEN IN DER METALLVERARBEITENDEN INDUS-
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accid. inhal. - chron. dos. - blood test B-2143.
217. Tanaka, S., and Ikeda, M.
A METHOD FOR DETERMINATION OF TRICHLOROETHANOL
AND TRICHLOROACETIC ACID IN URINE.
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(12 ref.), 1968.
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female - male - accid. inhal. - chron. dos. - metabolism - urin.
test B-2144.
218. Tauber, J.
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E - accidental - gen. - case hist. - solvents - humans - adults -
male - accid. inhal. - autop. - death B-2145.
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CARDIAC TOXICITY OF AEROSOL PROPELLANTS.
Journal of the American Medical Association (Chicago), 214(1):
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E - experimental - res. pap. - solvents - mammals - desc. admin.
- exper. inhal. - acute dos. - cardiovasc. syst. - death B-2146.
220. Taylor, G. J., and Harris, W. S.
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E - experimental - res. pap. - solvents - mammals - desc. admin.
- exper. inhal. - acute dos. - cardiovasc. syst. B-2147.

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EXPERIMENTS ON THE PHYSIOLOGICAL PROPERTIES OF
TRICHLORETHYLENE.
Journal of Industrial Hygiene and Toxicology (Cambridge, Mass.),
18(4): 175-193 (19 ref.), 1936.
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desc. admin. - exper. inhal. - chron. dos. - autop. - death
A-1841.
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- exper. inhal. - chron. dos. A-2148.
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- exper. inhal. - acute dos. - psych. test - cardiovasc. syst. -
resp. syst. B-2150.
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- death A-1842.

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E - experimental - res. pap. - solvents - mammals - exper. inhal. - acute dos. - toxicol. - chromatog. - cardiovasc. syst. - kid., liv. - resp. syst. - death B-2152.
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Archives of Environmental Health (Chicago), 2: 714-716 (7 ref.), 1961.
E - accidental - gen. - case hist. - gas. - humans - adults - male - accid. inhal. - acute dos. - impair. - autop. - kid., liv. - resp. syst. - death A-1843.
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LUNG CHANGES SECONDARY TO INHALATION OF UNDERARM AEROSOL DEODORANTS.
Clinical Toxicology (New York), 5(2): 299-303 (0 ref.), 1972.
E - accidental - experimental - gen. - case hist. - solvents - humans - mammals - adults - female - hosp. - autop. - biopsy - resp. syst. B-2153.
229. Weirich, J., and Micheels, K.-H.
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- exper. inhal. - autop. - kid. , liv. B-2155.
232. Wilson, R. H.
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Journal of the American Medical Association (Chicago), 123(17):
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hal. - blood test A-1847.
233. Wilson, R. H.
DIAGNOSIS AND TREATMENT OF INDUSTRIAL SOLVENT
POISONING.
Journal of the American Medical Association (Chicago), 139(14):
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hal. - chron. dos. - brain - nerv. syst. - dizz. - headache -
nausea - vomit. A-1848.
234. Winek, C. L. , Collom, W. D. , and Wecht, C. H.
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Lancet (London), 1: 365 (1 ref.), 1970.
E - intentional - lett. ed. - case hist. - anesth. - humans - adults
- male - intent. inhal. - acute dos. - blood test B-2156.
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AND BENZENE.
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- exper. inhal. - chron. dos. - toxicol. - blood test A-1849.

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POISONING, AND THEIR RESEMBLANCE TO THOSE IN THE
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E - accidental - gen. - case hist. - solvents - humans - adults -
male - accid. inhal. - acute dos. - hosp. - autop. - blood test -
urin. test - brain - cardiovasc. syst. - kid., liv. - resp. syst. -
death - urin. path. - vomit. A-1850.
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ORGANIC SOLVENTS BY MONKEYS.
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(10 ref.), 1970.
E - experimental - res. pap. - anesth. - solvents - mammals -
desc. admin. - exper. inhal. - intent. inhal. - chromatog. -
ataxia - death B-2157.

KEY WORD INDEX

A listing of the key words used to index the bibliography with accompanying citation numbers. Numbers prefaced with the letter A refer to citations in the Appendix.

Note: Hyphens between numbers indicate sequential numbering: 122-125 includes 122, 123, 124 and 125.

Alphabetic Key Word Listing

Note: The numbers on the right refer to the numbers in the Key Word Index. Individual substances are to be found listed in the Substance Index.

abstract only	4	cultural deprivation	52
accidental inhalation	26		
acute dosage	29	death	87
adolescents	21	dependence	44
adults	22	depression	41
alienation	39	description of administration	25
anemia	84	detection of sniffers	60
anesthetics	15	deviant behavior	53
anonymous	5	disorientation	45
anti-social behavior	53	dizziness	88
anxiety	40		
ataxia	85	editorial	6
autopsy results	69	electroencephalogram	73
		euphoria	46
biopsy	70	exhilaration	47
blood analysis	71	experimental inhalation	27
bone marrow	77		
brain	78	female	23
broken home	51		
		gasoline	16
cardiac arrhythmias	86	general discussion	12
cardiovascular system	79	general paper	7
case histories	11		
central nervous system	80	hallucinogens	48
character description given	38	headache	89
chemical aspects	33	hospitalization	66
children	20	humans	18
chromatography	72		
chronic dosage	30	impairment of consciousness	49
counselling	65	intentional inhalation	28
courts	59		

juvenile delinquents	61	respiratory system	83
		review of the literature	14
kidneys	81	rural residence	57
legislation	62	self-destructive behavior	53
letter to the editor	8	sociological tests	75
liver	81	solvents	17
loss of consciousness	49	spleen	81
lower class	55		
		tinnitus	91
male	24	tolerance	36
mammals (excluding humans)	19	toxicological aspects	37
metabolism	35	transient personality problems	50
middle class	56	tremors	92
nausea	90	upper class	56
nervous system (other than the CNS)	82	urban residence	58
		urinalysis	76
occasional use	31	urinary pathology	93
passivity	42	vomiting	94
peer group influence	54		
personality problems	43	weakness	95
pharmacological aspects	34		
police	63		
probation	67		
psychological tests	74		
psychotherapy	68		
recidivism	64		
recommendations	13		
regular use	32		
rehabilitation	67		
renal damage	93		
report	9		
research paper	10		

TYPES OF INHALATION

1. accidental accidental inhalation of
intoxicants
A3 - A5, A7 - A8, A10 - A11, A13 - A15,
A25, A36 - A37, A39 - A41, A43, A48,
A52, A55, A57, A60, A62, A64, A70,
A72 - A73, A75, A77 - A79, A87, A90,
A93, A96 - A97, A101, A105, A108 - A109,
A111 - A114, A121 - A123, A129, A131 - A132
A135 - A141, A145, A149, A160, A162 -
A163, A166, A168, A172, A179, A181,
A183, A187, A189 - A190, A201, A206 -
A208, A212 - A213, A218, A225, A227 -
A229, A232 - A233, A236
2. experimental experimental investigation
of intoxicants
66, 69, 81, 93 - 94, 115, 123, 135, 141,
148 - 149, 154, 176, 221, 223 - 225, 229,
231, 236, 264, A1 - A2, A6, A12, A16 -
A19, A21 - A24, A26 - A35, A37 -
A38, A40, A42, A44 - A47, A49 -
A51, A53 - A54, A56, A58 - A59, A61,
A63, A65 - A67, A69, A71, A74, A76,
A80 - A86, A89, A91 - A92, A94 -
A95, A98 - A100, A102 - A104, A106,
A110, A115 - A120, A124 - A128, A130,
A133 - A134, A142 - A144, A146 - A148,
A151, A153 - A158, A161, A164 - A165,
A167, A169 - A171, A173 - A178, A180,
A182, A184 - A186, A188, A191 - A200,
A202 - A205, A209 - A211, A214 - A217,
A219 - A224, A226, A228, A230 - A231,
A235, A237

3. intentional intentional abuse of intoxicants
1 - 273, A9, A20, A102, A152, A234

TYPE AND CONTENT OF DOCUMENT

4. abst. abstract only
30, 160, A103, A177
5. anon. anonymous (these consist of: 1) regular
documents which do not have an author's
name associated with them, 2) journal items
which do not have an author's name associated
with them and which do not expressly convey
the viewpoint of the editorial staff, and 3)
responses to letters to the editor which do not
have an author's name associated with them)
9 - 12, 14 - 19, 20, 22 - 23, 26, 29 - 30,
36, 39, A10
6. edit. editorial (these consist of journal items
which do not have an author's name associated
with them and which convey the viewpoint
of the editorial staff)
13, 21, 24, 27 - 28, 31 - 35, 37 - 38, 40 -
41, 95 - 96, 150, 183 - 184, 193, A7 - A9
7. gen. general paper
1 - 4, 6 - 8, 21, 44 - 49, 51 - 54
58 - 59, 63 - 65, 67 - 68, 70 - 71, 73 - 75,
78 - 79, 82, 84 - 87, 89, 91 - 92, 97, 99,
101 - 110, 112 - 114, 116 - 118, 121 - 122, 124 -
138, 140, 142 - 144, 146 - 147, 149, 151, 153,
155, 158 - 159, 161 - 162, 164 - 182, 185 -
192, 194 - 197, 199 - 208, 210 - 217, 219,
221 - 222, 224, 227 - 234, 236 - 242, 245,
247 - 262, 265, 268, 270 - 271, A3 - A5,

A10 - A11, A13 - A16, A20, A25, A29, A32
A36 - A37, A39, A41, A43 - A44, A48,
A51 - A53, A55, A57 - A60, A62, A64 -
A65, A67, A70, A72 - A73, A75, A77 -
A79, A87 - A88, A90, A93, A96 - A97,
A101, A105, A108 - A109, A111 - A114,
A121 - A123, A126, A129, A131 - A132,
A135 - A141, A145, A149 - A150, A152,
A155, A159, A162 - A163, A165 - A166,
A168, A172, A179, A181 - A183, A187,
A190, A193, A196 - A197, A201, A206 -
A208, A212 - A213, A218, A225, A227 -
A230, A232 - A233

8. lett. ed. letter to the editor

57, 72, 81, 98, 145, 198, 246, 263, 267,
269, 272 - 273, A12, A144, A189, A192,
A234

9. report

5, 11, 12, 14 - 16, 18 - 19, 22, 35, 40, 42
- 43, 50, 55 - 56, 61 - 62, 76 - 77, 83, 88,
90, 100, 111, 119 - 120, 139, 152, 156 - 157,
163, 209, 218, 220, 226, 235, 243 - 244,
266, A68

10. res. pap. research paper

60, 66, 69, 80, 93 - 94, 108, 115, 123,
141, 147 - 148, 154, 223, 225, 264, A1 -
A2, A6, A17 - A19, A21 - A24, A26 -
A28, A30 - A31, A33 - A34, A38, A40,
A42, A45 - A47, A49 - A50, A54, A56,
A61, A63, A66, A69, A71, A74, A76,
A80 - A86, A89, A91 - A92, A94 - A95,
A98 - A100, A102, A104, A106 - A107,
A110, A115 - A120, A124 - A125, A127 -
A128, A130, A133 - A134, A142,

A128, A130, A133 - A134, A142 - A144, A146
- A148, A151, A153 - A154, A156 - A158,
A161, A164, A167, A169 - A171, A173 - A176,
A178, A180, A184 - A186, A188, A191, A194 -
A195, A198 - A200, A202 - A205, A209 - A211,
A214 - A217, A219 - A224, A226, A231, A235,
A237

11. case hist. case histories

4, 7 - 9, 16, 38, 43 - 44, 46 - 50, 52 - 54,
58 - 60, 67 - 68, 71, 76 - 79, 84 - 89, 91 -
92, 97, 103 - 107, 109 - 110, 112 - 115, 117,
121 - 122, 124 - 125, 127 - 129, 131 - 133, 136,
138, 142 - 144, 146, 153, 157 - 158, 161, 164 -
167, 170 - 171, 173 - 174, 177, 180 - 182, 186 -
188, 190 - 191, 199, 201, 203 - 208, 211 - 215,
217, 221, 237 - 239, 247 - 248, 251 - 252,
257 - 259, 262, 265, 267 - 268, A3 - A5,
A7, A11, A14 - A15, A20, A22, A25, A29, A33,
A36, A39, A41, A48, A53, A55, A57, A60 -
A62, A64 - A65, A68, A70, A72 - A73, A75,
A77 - A79, A89 - A90, A93, A96, A101,
A105, A107 - A109, A111 - A112, A121 - A123,
A129, A132, A135 - A136, A139 - A141, A145,
A150, A152, A160, A162 - A163, A166, A168,
A172, A181, A183, A189, A200, A203, A207 -
A208, A212 - A213, A218, A227 - A229,
A234, A236

12. gen. disc. general discussion

6 - 7, 10, 17, 20, 23 - 29, 31 - 34, 36 - 37,
39, 41, 45 - 46, 63 - 65, 70, 73 - 75, 82,
99, 102, 108, 116 - 118, 126, 130, 135, 137,
140, 142, 149, 151, 155 - 156, 160, 162, 168 -
169, 172, 175 - 179, 183, 185, 189 - 190, 192
- 193, 200, 210, 216, 219, 222, 227 - 236,

238, 240 - 242, 245, 249 - 250, 253 - 256,
259 - 261, 263, 269 - 273, A8 - A9, A32,
A37, A42 - A43, A58, A113 - A114, A116,
A126, A131, A137 - A138, A149, A159, A15
A165 - A166, A179, A182, A187, A190,
A192 - A193, A196 - A197, A201, A206 -
A207, A225, A230, A232 - A233

13. recom. recommendations

7, 15, 25, 28 - 29, 42, 55, 88, 90, 124,
146, 150, 160, 170, 189, 193, 196, 209,
219 - 220, 230, 232, 234, 236, 238, 243,
245, 256, 266, 269, A1, A16, A42, A44,
A53, A78, A159, A163

14. review review of the literature

3, 7, 45, 47, 51, 55, 58 - 59, 63, 65, 70,
73, 87, 89, 101, 104, 108, 129, 131, 134,
137, 153, 157, 159, 161, 171, 190, 194 -
195, 201 - 202, 207, 215, 221, 224, 249, 253
253 - 254, 259, 265, A13 - A14, A17, A19,
A22 - A23, A29, A31, A33, A35, A42 - A43,
A51 - A52, A67 - A68, A87, A97, A113,
A116, A137 - A139, A145, A150 - A151,
A155, A158, A160, A187, A193, A196 -
A197, A221

INTOXICANTS

15. anesth. anesthetics, general, inhalation

2, 3, 8, 11 - 12, 17 - 18, 38, 47, 51, 57 -
58, 74, 79, 91, 97, 113, 122, 129, 133 -
134, 145, 154, 167, 172 - 173, 181, 183, 190,
201, 203 - 206, 214 - 215, 217, 221, 237,
239, 241, 257, 262, 272 - 273, A2, A7,
A9, A23, A27, A32 - A34, A42 - A45,
A51 - A52, A58, A63, A69, A84,

A51 - A52, A58, A63, A69, A84, A88, A94
- A95, A99, A110, A119, A134, A146, A151 -
A152, A161, A165, A169, A174 - A175, A177 -
A178, A223 - A224, A234, A237

16. gas. gasoline

1, 7, 9, 20 - 21, 37, 48, 52 - 54, 58 - 59,
62, 64, 68, 84 - 86, 92, 102, 105, 109, 125,
143 - 144, 151, 174, 176, 182, 198 - 199, 213,
247, 259, A3 - A4, A22, A25, A31, A48 -
A49, A56, A112, A116 - A117, A132, A138,
A173, A227

17. solvents

1, 4 - 7, 10, 13 - 16, 19, 22 - 37, 39 - 46,
48 - 50, 55 - 56, 60 - 67, 69 - 73, 75 - 78,
80 - 84, 87 - 90, 93 - 96, 98 - 104, 106 -
108, 110 - 112, 114 - 121, 123 - 124, 126 - 128,
130 - 132, 135 - 142, 146 - 153, 155 - 171,
175, 177 - 180, 184 - 189, 191 - 197, 200,
202, 207 - 212, 216, 218 - 220, 222 - 236,
238, 240 - 246, 248 - 256, 258, 260 - 261,
263 - 271, A1, A5 - A6, A8, A10 - A24, A28 -
A29, A30 - A31, A34 - A44, A46 - A47, A50 -
- A51, A53 - A55, A57, A59 - A62, A64 -
A68, A70 - A83, A85 - A87, A89 - A93,
A96 - A98, A100 - A109, A111, A113, A118 -
A131, A133, A135 - A136, A139 - A151, A153
- A158, A160, A162 - A164, A166 - A168,
A170 - A172, A176, A180 - A190, A192 -
A194, A196 - A199, A201 - A222, A225 -
A226, A228 - A233, A235 - A237

SUBJECTS OF DOCUMENT

18. humans

1 - 60, 62 - 80, 82 - 161, 163 - 273, A3 - A9, A11, A14 - A15, A18, A20, A23 - A25, A29, A32 - A34, A36 - A37, A39 - A43, A47 - A50, A52 - A68, A70 - A73, A75, A77 - A79, A81, A84 - A90, A93, A96 - A99, A101 - A102, A105, A107 - A113, A116 - A118, A121 - A123, A129, A131 - A132, A135 - A142, A145, A148 - A150, A152 - A153, A156 - A63, A165 - A166, A168 - A169, A172, A178 - A181, A183, A187, A189 - A190, A192, A194, A198 - A205, A207 - A214, A216 - A218, A225, A227 - A229, A232 - A234, A236

19. mammals mammals (excluding humans)

81, 108, A1, A6, A12 - A13, A17, A19, A21, A26 - A31, A33, A35, A38, A45 - A46, A50, A54, A63, A67, A69, A74, A76, A80, A82 - A83, A92, A94 - A95, A100, A103 - A104, A106, A115, A119 - A120, A124 - A125, A127 - A128, A130, A133 - A134, A143 - A144, A146 - A147, A151, A154 - A155, A157 - A158, A164, A167, A171, A173 - A178, A180, A184 - A186, A188, A191 - A192, A195, A198, A215, A217, A219 - A224, A226, A228, A231, A235, A237

AGE GROUP OF HUMANS

20. child. children (to 12 years of age)

1, 5 - 7, 14, 19, 23, 26, 31, 33, 37, 39, 45, 54 - 55, 60, 63, 70, 73, 76 - 77, 85,

89, 92, 100 - 101, 103, 108 - 109, 111, 116 - 120, 123, 126, 137, 142, 148, 150, 153, 155 - 157, 159, 161, 170, 174, 176 - 179, 185 - 186, 189, 192 - 194, 197 - 198, 200, 202, 207, 213, 216 - 219, 227, 229 - 236, 240, 244, 250, 254, 265, 270, A4, A22, A101, A109, A113, A129, A183, A200

21. adoles. adolescents (from 13 to 20 years of age)

1, 4 - 7, 9, 13 - 14, 17, 19 - 21, 23 - 27, 29 - 37, 39, 44 - 46, 48 - 50, 53 - 55, 59 - 60, 63 - 73, 75 - 77, 80, 84 - 86, 88 - 90, 93 - 94, 96, 98, 101, 103 - 106, 108, 110 - 111, 114, 116 - 118, 123 - 124, 126, 128, 130, 133, 135 - 142, 144, 146 - 148, 150, 152, 155 - 157, 159, 161, 168 - 171, 173, 175 - 180, 182, 185, 188 - 189, 191 - 194, 197, 199 - 200, 202, 207, 213, 216, 218 - 219, 222 - 236, 240, 242, 244, 247 - 248, 250 - 251, 253 - 254, 259 - 261, 264, 267 - 271, A3, A20, A22 - A23, A50, A56, A77, A93, A99, A102, A113, A117 - A118, A121, A139, A145, A200, A207

22. adults adults (from 21 years of age)

2 - 3, 8, 10 - 12, 16, 18, 38, 40 - 41, 43, 47, 50, 52, 58, 67, 73, 75, 78, 87, 91, 97, 107, 112 - 113, 115, 121 - 122, 125, 129, 132, 137, 141, 143, 145, 158, 164 - 167, 172, 176, 181, 187, 190, 201, 203 - 206, 208, 211 - 212, 214 - 215, 221 - 222, 232 - 233, 237 - 239, 252, 254, 257 - 258, 262, 265, A5 - A7, A11, A14 - A15, A18, A22 - A26, A33 - A34, A36, A39 - A42, A48 - A50, A53, A55 - A57, A61 - A66, A70 - A72, A75, A78 - A79, A86 - A87, A89 - A90, A93, A96,

A98 - A99, A102, A105, A108, A110, A112
 - A113, A116 - A118, A121, A123, A129,
 A135, A139 - A142, A145, A150, A153,
 A160 - A163, A166, A168, A178, A189,
 A199 - A200, A203, A208 - A213, A216,
 A218, A227 - A229, A234, A236

SEX OF HUMANS

23. female

1 - 2, 4, 7, 18 - 19, 44, 50, 54 - 55, 58,
 60, 64, 70, 74, 87, 93 - 94, 97, 101, 103,
 108, 110 - 111, 114, 117 - 119, 129, 133,
 136, 138, 143 - 144, 147 - 148, 164, 167,
 178, 182, 187 - 188, 191 - 194, 197, 200 -
 201, 204 - 205, 207, 213, 216, 222 - 225,
 229 - 234, 236 - 237, 240, 248, 251, 258,
 260 - 261, 264, A18, A20, A23, A53,
 A56, A61, A63, A67, A89, A93, A99,
 A102, A108, A113, A129, A135, A139,
 A142, A161, A163, A178, A194, A199 -
 A200, A202, A217

24. male

1 - 2, 5 - 12, 16 - 19, 21, 26, 29, 31, 33,
 35, 38, 40 - 41, 43 - 50, 52 - 55, 58 -
 60, 64, 66 - 72, 75 - 80, 84 - 88,
 91 - 96, 98, 101, 103 - 109, 112 - 113,
 115 - 119, 121 - 125, 128, 132, 141, 144 -
 148, 155, 158 - 159, 165 - 167, 171 - 181,
 190 - 194, 197, 199 - 201, 203, 206, 208,
 210 - 211, 213 - 217, 221 - 226, 228 - 234,
 236, 240, 242, 244, 246 - 247, 252 -
 254, 257, 259 - 262, 264, 267 - 268,
 271, A3 - A5, A7, A11, A14 - A15, A18,
 A23 - A25, A36, A39 - A41, A48 - A49,

A56 - A57, A61 - A67, A70 - A71, A73,
 A75, A77 - A79, A86, A89 - A90, A93,
 A96, A99, A101 - A102, A109 - A110, A112 -
 A113, A116 - A117, A121, A123, A129, A135 -
 A136, A139 - A142, A145, A150, A152 - A153,
 A160 - A162, A168, A178, A189, A194, A199
 - A200, A202 - A203, A207 - A214, A216 -
 A218, A227, A234, A236

DOSAGE PATTERN

25. desc. admin. description of administration
given

1, 6, 17, 19, 23, 26, 45 - 47, 50 - 51, 55,
 57, 59 - 60, 62 - 65, 67, 70, 73, 75, 101,
 103, 108, 132, 137, 140, 142, 155, 170, 192,
 197, 199, 202, 210, 219, 230, 233 - 234,
 250, 271, A1, A6, A30 - A31, A33, A38,
 A49 - A50, A54, A56, A63, A67, A69, A76,
 A80, A92, A94 - A95, A99 - A100, A104,
 A106, A115, A119 - A120, A124 - A125, A127
 - A128, A130, A133 - A134, A142 - A143,
 A146, A151, A154, A156 - A157, A161, A164,
 A167, A171, A173 - A176, A178, A185 -
 A186, A188, A191, A204, A209, A211, A214 -
 A215, A219 - A224, A231, A235, A237

26. accid. inhal. accidental inhalation

48, 131, 238, 259, 265, A3 - A5, A8, A11,
 A14 - A15, A18, A22 - A25, A33, A36 - A37,
 A39 - A41, A43, A47 - A48, A55, A57, A59
 A61, A65, A67 - A68, A71, A75, A77 - A79,
 A85 - A87, A89 - A90, A96, A98, A105,
 A107 - A108, A111 - A112, A116 - A118, A121 -
 A123, A129, A131, A135 - A136, A138 - A141,
 A145, A148, A150, A153, A158, A160, A162 -

A163, A166, A168, A172, A181, A183,
A187, A193 - A194, A197 - A198, A201 -
A203, A207 - A208, A212, A216 - A218,
A227, A229, A232 - A233, A236

27. exper. inhal. experimental inhalation

108, A1, A6, A12 - A13, A17 - A19, A21,
A26 - A28, A30 - A31, A33 - A35, A37,
A42, A45 - A46, A49 - A51, A54, A56,
A59, A63, A67, A74, A76, A80, A82 -
A84, A92, A94 - A95, A99 - A100, A103 -
A104, A106, A110, A115, A117, A119 - A120
A124 - A125, A127 - A128, A130, A133 -
A134, A142 - A144, A146, A151, A154 -
A159, A161, A167, A169, A171, A173,
A175 - A178, A180, A184 - A185, A188,
A191, A195, A198 - A199, A204 - A205,
A209 - A211, A214 - A215, A219 - A224,
A226, A231, A235, A237

28. intent. inhal. intentional inhalation

1 - 3, 4 - 5, 7 - 12, 14, 16 - 18, 20 - 24,
26 - 27, 32, 36, 40 - 41, 43 - 47, 49 -
56, 58 - 60, 62, 64 - 80, 82 -
99, 101 - 151, 153 - 159, 161, 164 - 165,
167 - 183, 185 - 192, 194, 197 - 202,
204 - 234, 236 - 244, 246 - 251, 253 -
255, 257 - 265, 267 - 272, A7, A9, A20,
A22 - A23, A32 - A33, A102, A152,
A200, A234, A237

29. acute dos. acute dosage

48, 65, 81, 131, 265, A1, A3 - A4, A6 -
A7, A9, A11 - A14, A18 - A20, A22 -
A23, A26 - A31, A33 - A34, A36 - A43,
A45 - A52, A54 - A57, A59, A64, A87,

A90, A96, A100, A111, A122 - A123, A129,
A131, A133, A136, A138, A140, A144, A152,
A156 - A158, A161, A169, A173, A176, A181,
A183, A185, A191, A193, A199, A203 - A208,
A210 - A212, A214 - A215, A219 - A220,
A223 - A224, A226 - A227, A229, A234,
A236

30. chron. dos. chronic dosage

39, 48, 51 - 52, 131, A1, A5 - A6, A10, A13,
A15, A17, A19, A21, A24 - A25, A29, A33,
A38, A43, A51, A54, A59, A61, A70 - A71,
A75, A77, A79, A85 - A87, A96, A98,
A106 - A108, A112, A116 - A118, A121 - A122,
A131, A135, A138 - A139, A145, A150, A153,
A157 - A158, A160, A162 - A163, A166,
A168, A171 - A172, A185, A188, A191, A193 -
A195, A198, A202, A209 - A210, A216 -
A217, A221 - A222, A233, A235

31. occas. use occasional use

26, 44, 50, 54, 93, 124, 141, 156 - 157, 190,
223 - 225, 264, A102

32. reg. use regular use

1 - 5, 7 - 8, 10 - 12, 16 - 18, 21, 24, 26, 29,
32, 38, 40 - 41, 43 - 44, 47, 50 - 53, 55,
58 - 60, 64, 66 - 72, 76 - 78, 80, 82 - 89,
91 - 94, 97, 101, 103 - 126, 128 - 135, 138,
141 - 146, 148 - 149, 153 - 154, 156 - 159,
161, 164 - 165, 167, 170, 171, 173 - 175, 177
- 182, 186 - 188, 190 - 192, 194, 197 - 202,
204 - 212, 214 - 225, 229 - 234, 236 - 241,
243 - 244, 246 - 251, 253 - 255, 257 - 258,
260 - 265, 270 - 272, A53, A102

POINTS OF DISCUSSION

33. chem. chemical aspects

19 - 20, 64 - 65, 136, 156 - 157, 171, 176
- 177, 179, 208, 253, A8, A22, A29,
A35, A37, A50, A87, A92, A104, A114,
A132, A137 - A138, A155, A193, A206

34. pharmacol. pharmacological aspects

44, 69, 83, 99, 138, 147, 162, 214, 241,
A29, A35 - A37, A40, A43, A51, A114,
A119, A124, A128, A130, A137, A143

35. metabolism

44, 49, 67, 115, 175, 268, A14, A18, A20,
A22 - A23, A28, A38, A74, A81, A87,
A90, A92, A108, A126, A143, A157, A169
- A170, A185, A193, A199, A205 - A206,
A217

36. toler. tolerance

19, 23, 25, 30, 32 - 33, 48, 55, 58, 60,
62 - 64, 70, 73, 91, 100, 103, 108, 110,
116, 137, 155 - 157, 170, 194 - 195, 197,
202, 219, 235, 239, 249, 252 - 253, 271

37. toxicol. toxicological aspects

44 - 45, 49, 65, 81, 107, 124, 126, 130 -
131, 137, 151, 159, 194, 229, 231, 253,
A1, A10, A12 - A14, A17, A19 - A20,
A22 - A23, A26, A29 - A31, A33, A35,
A38, A40, A43, A46, A51, A56, A67,
A80, A86 - A87, A93, A97, A100 - A101,
A104, A106, A114 - A115, A119 - A121,
A128, A133, A136 - A137, A144, A147,
A151, A155, A157 - A158, A164, A171,

A173, A186, A188 - A189, A193, A196 -
A198, A201, A206, A215, A225 - A226,
A230, A235

PSYCHOLOGICAL STATE AND PERSON-
ALITY38. charac. desc. character description given

4, 48, 64, 85 - 86, 88, 100, 106, 110, 159

39. alien. alienation

1, 55, 59, 85, 100, 104, 140, 142, 163,
173, 209

40. anx. anxiety

7, 8, 52 - 54, 64, 85, 88 - 89, 92, 122,
140, 155 - 157, 160 - 161, 164, 167, 170,
174, 176 - 177, 179, 190, 199, 204 - 205,
207 - 208, 214, 239, 247 - 248, 259, 271,
A160

41. depress. depression

7, 19, 38, 60, 92, 98, 122, 128, 133, 144,
156 - 157, 160 - 161, 164, 174, 181, 190,
204 - 205, 214, 248, 254

42. passiv. passivity

6, 88, 140, 152, 170, 174, 259, 271

43. pers. prob. other personality problems

2, 4, 9, 19, 44, 48, 52, 60, 64, 68, 85 -
86, 89, 98, 106 - 108, 110, 112, 116, 132,
139, 158, 165 - 166, 173, 177 - 179, 182,
186 - 187, 190, 199, 213, 222, 245, 259

PSYCHOLOGICAL EXPERIENCES

44. depend. dependence

4, 6 - 8, 13, 19, 23, 30, 38, 43, 47, 52,
55, 62 - 64, 70, 73, 85, 88 - 89, 91, 95,
99 - 100, 103 - 104, 108, 114, 122, 129,
133, 142, 146, 164, 166, 173, 181, 190,
204 - 205, 207, 212, 216, 221, 235, 241,
249, 257, 265, 270 - 271, A33, A87

45. disorient. disorientation

19, 21, 23 - 24, 64, 67, 87, 103 - 104,
115, 128, 160, 181, 190, 216, 258 - 259,
A13, A112

46. euph. euphoria

1, 3, 6 - 8, 16, 19, 23 - 27, 30, 32, 45,
52, 54 - 56, 58, 63 - 64, 67, 70, 73 -
75, 80, 84 - 85, 89, 99, 100, 104, 106 -
108, 110, 112, 114, 122, 128, 132, 137, 140
142 - 143, 153, 155 - 157, 160, 164, 170,
173, 177, 179, 182, 186, 190 - 195, 197,

47. 202 - 203, 208, 210, 212, 215 - 216,
218 - 219, 221 - 222, 229 - 234, 243, 249
- 250, 253, 259 - 261, 268, A48, A51,
A55, A59, A99, A16147. exhil. exhilaration

3, 6, 19, 23 - 25, 28, 30 - 31, 33, 36,
64, 70, 73, 84, 103, 106, 108, 118, 120,
132, 154, 160, 170, 172, 177, 179, 185,
189, 191 - 192, 211, 214, 217 - 219, 229,
231, 250, 258

48. hallu. hallucinations

6 - 8, 19, 26, 32, 36, 39, 48, 51 - 55,

58 - 60, 62 - 64, 67 - 68, 70, 73, 75, 84 -
87, 91, 92, 99, 104 - 106, 109 - 110, 112, 114
- 116, 122, 128, 134, 136 - 137, 142 - 144,
146, 153 - 158, 160, 165 - 166, 170, 173, 176,
181, 185 - 186, 189, 190, 192 - 194, 199, 201,
208, 216, 219, 221 - 222, 235, 237, 239,
243, 246 - 247, 249 - 250, 253, 259, 261,
271, 273, A25, A160

49. impair. impairment or loss of consciousness

1, 4, 6, 8, 10 - 14, 19, 21, 23 - 37, 39, 41,
45 - 46, 48, 51 - 53, 55, 58 - 60, 62 - 64,
70, 73, 78, 80, 86 - 87, 91 - 92, 97, 103 -
106, 108, 110, 112 - 113, 117 - 119, 121 - 122,
124, 126, 129, 131, 133, 136 - 138, 140, 144,
146 - 147, 153, 155 - 157, 165 - 167, 170,
173, 177, 179, 186, 189, 192, 194 - 195, 198
- 199, 203 - 207, 210 - 211, 215, 218, 221,
235, 237 - 239, 249 - 252, 254, 257, 270 -
271, A5, A11, A13, A17, A20, A25, A29,
A33, A41 - A42, A47, A50, A59, A72 -
A73, A77 - A78, A97, A116, A132, A136,
A152, A154, A161, A181, A203, A208, A227

50. trans. prob. other transient problems

2, 8, 59, 64, 70, 79, 97, 114 - 116, 146,
177, 179, 219, A25, A99, A160

SOCIOLOGY

51. brok. home broken home

8 - 9, 19, 45, 52, 55, 68, 76 - 77, 84, 88,
100 - 101, 104 - 105, 116, 137, 142, 156 - 159,
161, 163, 165, 170, 176 - 179, 194, 197, 215,
219, 229 - 231, 236, 244 - 245, 259

52. cult. depriv. cultural deprivation
1, 7, 45, 48, 53 - 54, 59 - 60, 64, 75 -
77, 82 - 83, 85 - 86, 88, 92, 100, 105,
108, 111, 119, 130, 139 - 140, 144, 152,
156 - 158, 160 - 161, 177 - 179, 194, 197,
227, 248, 266, 271

53. deviant behav. deviant, anti-social,
self-destructive behavior
4, 7 - 8, 19, 26 - 27, 29 - 30, 32 - 33,
35, 39, 46, 55, 62 - 64, 70, 76 - 77,
101, 103, 130, 155 - 157, 160 - 161, 170 -
171, 173, 176 - 177, 179, 186, 194, 197,
202, 204 - 206, 209, 212 - 213, 232 -
233, 235 - 236, 247, 249, 253, 257,
259, 271

54. peers peer group influence
5, 7, 19, 31 - 32, 45, 60, 64, 68, 84,
104, 108, 111, 119, 124, 137, 140, 176,
186, 200, 230, 234, 263, 271

SOCIO-ECONOMIC STATUS

55. low. class lower class
1, 5, 7, 19, 23, 39, 45, 55, 60, 63 - 64,
70, 76 - 77, 85 - 86, 88, 95, 100, 103,
108, 111, 116, 137, 139, 155, 158, 160 -
161, 163, 170, 174, 192, 216, 219, 226 -
228, 244 - 245, 254, 261, 265
56. mid., upper class middle or upper
class
50, 55, 82 - 83, 99 - 100, 186, 204 -
205, 222, 226, 228

57. rural
5, 48, 85, 92, 259

58. urban
6, 39, 45, 48, 64, 76 - 77, 146, 216, 226,
228, 236

LAW ENFORCEMENT

59. courts
1, 10 - 12, 18, 35, 40 - 41, 45, 47, 90, 98,
121, 139, 150, 181 - 182, 184 - 185, 200,
209, 227, 248

60. detect. detection of sniffers
25 - 26, 28, 62, 75, 197, 210, 249, 270

61. juven. juvenile delinquents
1, 5, 23 - 24, 27, 31, 45, 48, 55, 64, 70,
75 - 77, 84, 88, 103, 108, 144, 155 - 157,
160 - 161, 163, 182, 184, 191, 193 - 194, 197,
222, 226, 228, 232 - 233, 247

62. legis. legislation
6, 13, 15, 33, 42, 61, 64, 70, 76 - 77, 88,
96, 99, 118, 140, 150, 160, 168 - 169, 184 -
185, 194 - 195, 197, 209, 218 - 219, 226,
232 - 233, 254, 260 - 261, A68, A149

63. police
8, 46, 64, 76 - 77, 90, 149, 158, 168 - 170,
185, 193 - 194, 197, 200, 209, 226 - 228,
236, 254, 257, 260 - 261, 271

64. recidiv. recidivism

1, 59, 88, 101, 105, 150, 156 - 157, 178,
182, 195, 201, 236, 244, 249

TREATMENT

65. couns. counselling

5, 88, 139, 152, 209 - 210, 226 - 228,
243 - 245, 266

66. hosp. hospitalization

4, 7 - 8, 32, 38, 44, 54, 58 - 60, 67 -
68, 84 - 85, 87, 91 - 92, 98, 103, 106 -
107, 110, 112, 114 - 117, 119, 125, 129,
138, 143 - 144, 146, 153, 158, 164 - 166,
173, 177, 179 - 180, 182, 186 - 191, 203 -
205, 208, 211, 214, 222, 237, 239, 247 -
248, 252, 257 - 259, 262, 271, A5, A11,
A14 - A15, A25, A33, A39 - A41, A43,
A57, A61 - A62, A64 - A65, A70, A73,
A75, A77, A85, A89, A96, A108 - A109,
A112 - A113, A140, A145, A160, A162,
A168, A172, A213, A228, A236

67. probat., rehab. probation and rehabilita-
tion

1, 5, 64, 76 - 77, 88, 90, 182

68. psychother. psychotherapy (therapy more
intense than counselling)

2, 4, 54, 60, 92, 144, 177, 179, 195, 199,
222, 248, 252

TESTS PERFORMED

69. autop. autopsy results

49 - 50, 67, 71 - 72, 78, 98, 138, 171, 191,
207, 213, 242, 251, 254, 267 - 268, A1,
A3 - A4, A11, A13, A17, A19, A22 - A23,
A30, A33, A50, A61 - A62, A67, A70, A79,
A89, A93, A100, A106 - A107, A109, A112 -
A113, A127 - A128, A130, A139 - A140, A147,
A164, A168, A173 - A174, A185 - A186, A191,
A198, A200, A215, A218, A221, A227 - A228,
A231, A236

70. biopsy

44, 67, 70, 84, 106, 112, 125, A15, A61,
A90, A107, A139, A228

71. blood test blood analysis

44, 46, 49, 54, 63, 66 - 67, 69, 71, 84,
91, 103, 106, 110, 112, 117, 121, 125, 128,
132, 138, 143 - 144, 146 - 148, 156 - 157,
161, 164, 180, 191 - 192, 195, 211, 214, 229 -
231, 234, 252 - 253, 262, 268, A1 - A2,
A11, A14, A18 - A19, A21 - A23, A25, A36,
A38, A40 - A41, A45, A54, A57, A61 -
A63, A66 - A67, A75, A77, A81, A85 -
A86, A89, A92 - A94, A96, A98, A107 -
A108, A113, A116 - A118, A128, A130, A135,
A138 - A141, A143, A145, A148, A156 -
A157, A163, A167 - A170, A172, A175, A179,
A182, A185, A187 - A188, A195, A202 -
A205, A209 - A211, A213 - A216, A232,
A234 - A236

72. chromatog. chromatography

49, 69, 71, 161, 171, 180, A22 - A23, A44,
A54, A93, A167, A171, A182, A226, A237

73. EEG electroencephalogram

1, 4, 7, 44, 48, 52, 54 - 55, 59 - 60,
62 - 63, 66 - 67, 73, 82 - 83, 85, 92,
99, 101, 103, 114, 116, 132, 136, 143 - 144,
158, 161, 171, 177, 179, 195, 211, 247, 249,
259, 262, A6, A25, A42, A65, A84, A94,
A99, A150

74. psych. test psychological tests

7, 46, 52, 54, 59, 68, 70, 80, 85 - 86,
92, 104 - 106, 114, 116, 129, 132, 144,
153 - 154, 158, 161, 174, 176, 186 - 187,
192, 199, 214, 237, 244, 247 - 248, 252,
A34, A47, A66, A80 - A83, A99, A102 -
A103, A110, A153, A161, A167, A178,
A194, A211, A214, A224

75. socio. test sociological tests

194, 244

76. urin. test urinalysis

26, 44, 46, 54, 59, 63, 67, 71, 84 -
85, 87, 92, 103, 106, 110, 112, 115 - 117,
121, 128, 132, 143, 147 - 148, 161, 175,
192, 195, 211, 214, 229 - 231, 234, 244,
262, A1, A11, A14 - A15, A18, A20, A22
- A25, A28, A36, A39 - A41, A50, A55,
A57, A61, A70, A75, A81, A85 - A86,
A89 - A90, A92, A96, A101, A107 - A108,
A113, A116 - A117, A120, A131, A139 -
A140, A143, A156 - A157, A163, A171,
A179, A184 - A185, A194 - A195, A199,
A203 - A204, A209, A212 - A214, A217,
A236

ANATOMY AFFECTED

77. bone mar. bone marrow

13 - 14, 25, 50, 55, 60, 62, 64, 66, 70, 73,
83, 96, 99, 103, 112, 117, 128, 132, 162, 164,
191, 195, 197, 249, A13, A19, A21, A37,
A75, A77, A126, A139, A143, A145, A148,
A185, A187

78. brain

13, 16, 26, 37, 50, 64, 66, 70, 75, 82,
151, 171, 183, 185, 191, 197, 218, 249, 272,
A4 - A5, A29, A109, A123, A139, A141, A143,
A165, A173, A202, A233, A236

79. cardiovasc. syst. cardiovascular system

20, 25 - 26, 36 - 37, 39, 46, 55 - 56, 60,
62, 64, 66 - 67, 70 - 72, 75, 78, 81, 98 -
99, 102 - 103, 128, 138, 156 - 157, 164, 189,
229, 231 - 234, A1, A12, A27, A29, A31,
A33, A36, A43, A45 - A46, A52, A54, A68,
A70, A75 - A76, A90, A95, A97, A101,
A109, A121, A125, A128, A134, A141 - A142,
A146, A151, A155 - A156, A158, A174, A176
- A177, A213, A219 - A220, A224, A226,
A236

80. CNS central nervous system

7, 16, 20, 26, 31, 39, 46, 48, 55, 65, 69,
73, 80, 87 - 88, 92, 97, 99, 103, 117 - 118,
125, 128, 132, 176 - 177, 179, 185, 192, 194,
218, 226, 229, 231 - 235, 238, 241, A1, A3,
A13, A19 - A20, A25 - A26, A39 - A41, A43,
A50, A52, A65, A68, A78, A101, A114 -
A115, A121, A136, A138, A151, A161, A163,
A165, A173, A178 - A179, A193 - A194,

A206 - A208, A211 - A212

81. kid., liv. kidneys and liver (including the spleen)
2, 7, 9, 13 - 14, 25 - 26, 33, 36 - 37, 39, 44, 46, 49 - 50, 53, 55 - 56, 60, 62, 64, 66 - 67, 70, 73, 75, 83, 88, 96, 103, 105, 107, 112, 117, 119, 121, 132, 138, 147 - 149, 155, 162, 164, 171, 176, 185, 197, 210, 218, 230, 232 - 233, 235, 241, 268, A1, A4, A10 - A11, A13, A29, A36 - A37, A41, A45, A50 - A51, A57, A59, A64, A68, A70, A74, A77, A86, A89 - A90, A93, A96 - A97, A100, A108 - A109, A111 - A113, A120, A123, A127 - A128, A132, A135, A138 - A140, A143, A147, A151, A155, A157 - A158, A162 - A164, A168, A171, A186, A188, A193, A196 - A198, A202 - A203, A208, A213, A215, A226 - A227, A231, A236
82. nerv. syst. nervous system (other than the CNS)
14, 16, 20, 25, 39, 43 - 44, 46, 59, 70, 75, 96 - 97, 103, 106, 112, 125, 147, 156 - 157, 175 - 176, 183, 187 - 188, 211, 235, 238, A43, A49, A65, A78, A81, A136, A138, A150, A162, A165 - A166, A172, A175, A187, A194, A233
83. resp. syst. respiratory system
7, 13, 20, 25, 31, 33, 36, 49 - 50, 55 - 56, 62, 64, 73, 75, 88, 98 - 99, 103, 105, 121, 138, 155, 171, 175 - 176, 210, 232 - 233, 242, 267, A1, A3, A4, A11, A13, A29, A33, A37, A43, A48, A50, A52, A58, A63, A68 - A69, A93 - A94,

A58, A63, A68 - A69, A93 - A94, A100, A104, A106, A113, A119, A128, A138, A140, A143, A145, A151, A158, A180, A191, A196, A200, A212 - A213, A215, A224, A226 - A228, A236

PATHOLOGY

84. anemia
26, 37, 46, 62 - 64, 70, 99, 151, 155, 185, 191, 230, 232 - 233, 249, A4, A21, A39, A50, A61, A67, A75, A107, A126, A139, A145, A148, A168, A172, A188, A196
85. ataxia
1, 6, 19, 21, 25, 28, 33, 47 - 48, 54 - 56, 62, 64, 70, 87 - 88, 100, 103 - 105, 108, 121, 128, 132, 136, 143, 147, 151, 170, 193, 259, 270, A4, A13 - A14, A51, A80, A138, A237
86. card. arrhy. cardiac arrhythmias
37, 50, 55, 102, A54, A94 - A95, A121, A146, A158, A176, A192
87. death
9, 17 - 18, 21 - 22, 25, 28, 33, 37 - 38, 40, 48 - 51, 53, 57 - 58, 62 - 65, 67, 69 - 72, 76 - 78, 96, 98 - 99, 102 - 103, 105, 121, 127, 138, 151, 155, 171 - 172, 183, 185, 195, 206 - 207, 213, 217, 219, 227, 229, 231 - 233, 242, 250 - 251, 254 - 255, 259 - 261, 267 - 269, A1, A3 - A4, A7, A9, A11 - A13, A17, A22 - A24, A29 - A31, A33, A38, A43, A50 - A51, A59, A62, A64, A68 - A70, A75, A79, A89, A93 - A95, A97, A100,

A104, A106 - A107, A109, A111 - A113,
A115, A119, A121, A123, A125, A128, A130,
A133, A138, A140, A144 - A145, A147,
A149, A151, A154, A164, A168, A171, A177,
A179 - A180, A183, A187, A191, A195 -
A196, A198, A200, A213, A215, A218 -
A219, A221, A225 - A227, A236 - A237

88. dizz. dizziness

1, 19, 26, 31 - 32, 45, 48, 55 - 56, 59,
62 - 64, 68, 75, 80, 97, 105, 107, 116 -
118, 128, 132, 134, 155 - 157, 164, 191 -
193, 195, 211, 229 - 234, 249 - 250, 253
- 254, A5 - A6, A14, A36, A39, A41,
A43, A56, A59 - A60, A62, A68, A75,
A77, A79, A81, A85, A96, A108 - A110,
A112 - A114, A121, A137 - A138, A150,
A163, A166, A168, A194, A202, A207,
A212, A233

89. headache

1, 7, 21, 31, 39, 43 - 46, 48, 56, 59,
64, 73, 75, 84, 97, 105, 114, 132 - 133,
135, 137, 147, 164, 181, 191, 200, 210 -
211, 215 - 216, 229 - 235, 247, 254, 258
- 259, A5, A10, A25, A29, A36, A39 -
A41, A48, A50, A55 - A57, A59 - A61,
A65, A67 - A68, A70, A72, A75, A79,
A85, A90, A96 - A97, A108 - A109, A113
- A114, A132, A136 - A137, A144, A148,
A160, A163, A193 - A194, A202, A206,
A209 - A210, A213, A233

90. nausea

1, 7, 21, 39, 44, 55, 59 - 60, 63 - 65,
67, 70, 84, 103, 105, 108, 114, 116 - 118,

132 - 133, 137, 143, 147, 154, 177, 179, 181
- 182, 191 - 193, 211, 214, 235, 247, 250,
A6, A10 - A11, A13 - A14, A29, A36, A40 -
A41, A47 - A48, A50 - A51, A55, A59 -
A60, A64, A68, A85, A96 - A97, A101,
A108 - A111, A113 - A114, A119, A121, A129,
A131, A137, A140, A144, A149, A161, A168,
A188 - A189, A193 - A194, A202, A207,
A211 - A213, A233

91. tinnitus

25, 28, 32 - 33, 39, 48, 55 - 56, 60, 63 -
64, 70, 88, 103, 105, 108, 116, 128, 132,
136, 147, 170, 192, 200, 218, 231 - 233,
235, 247, 270 - 271, A59

92. tremors

16, 45, 47 - 48, 64 - 65, 73, 75, 107, 112,
115, 130, 132 - 133, 137, 143, 146, 151, 172,
177 - 179, 181, 208, 229 - 234, 272, A25 -
A26, A81, A113 - A114, A136 - A138, A179 -
A180, A189

93. urin. path. urinary pathology (including
renal damage)

25 - 26, 37, 44, 53, 62, 73, 82 - 84, 103,
105, 128, 147 - 148, 155, 180, 195, 213 -
214, 229, 231, 233 - 234, 249, 253, A11,
A36 - A37, A40, A57, A59, A64, A68,
A70, A89 - A90, A101, A111, A113, A140,
A213, A229, A236

94. vomit. vomiting

1, 4, 7, 44, 49, 55, 60, 63 - 65, 67, 70,
84, 97, 103, 116 - 118, 121, 129, 134, 137,
143, 180 - 182, 191 - 193, 211, 214, 239,

247, 262, A5, A11, A13, A25, A29, A36,
A40 - A41, A47, A50 - A51, A55, A57,
A59 - A60, A64, A67 - A68, A70, A72,
A89 - A90, A96 - A97, A101, A109, A111,
A113 - A114, A119, A121, A129, A137, A140,
A144, A149, A161, A168, A188 - A189,
A193 - A194, A202, A212 - A213, A233,
A236

95. weak weakness

48, 59, 65, 106, 125, 133, 191, 208, 214,
221, 259, A29, A36, A40, A48, A55, A
A61 - A62, A75, A77, A97, A108, A113 -
A114, A136 - A137, A145, A148, A202,
A207

AUTHOR INDEX

An alphabetical listing of the names of authors whose articles are cited. Item numbers for senior authors are underlined. The letter A appearing before numbers refers to the Appendix.

Note: Hyphens between numbers indicate sequential numbering: 122-125 includes 122, 123, 124 and 125.

- Abston, S. 213
 Ackerly, W. C. 1
 Adams, E. M. A1
 Adams, E. W. 2
 Adams, W. L. A2
 Adams, W. T. 45
 Agnew, L. R. C. 3
 Aidin, R. A3
 Ainsworth, R. W. A4
 Al'apin, B. 4
 Albrecht A5
 Alex, T. 5
 Allen, S. M. 6
 Allison, G. E. 7
 Alloza Feced, J. A46
 Amaldi, P. 8
 Andersen, P. A6
 Ankermann, H. A223
 Anonymous 9 - 41, A7 - A10
 Archibald, H. D. 42
 Ashe, W. F. A11
 Atchison, G. J. A143
 Awen, C. F. 171
 Azar, A. A12, A176

 Baader, E. W. 43
 Baerg, R. D. 44
 Baernstein, H. D. A157
 Baker, A. B. A13, A38
 Baker, C. A55
 Baker, H. M. A14
 Baker, K. C. A15
 Baretta, E. D. A210 - A211
 Barker, G. H. 45
 Barman, M. L. 46
 Barrett, H. M. A16 - A17

 Bartholomew, A. A. 47
 Bartlett, S. 48
 Bartoníček, V. A18
 Batchelor, J. J. A19
 Baselt, R. C. 49
 Bass, M. 50
 Beamer, W. H. A143
 Beedle, D. B. 46
 Bekman, S. C. 187
 Bell, Z. G. A49
 Beluze 51
 Bender, W. A160
 Benkel, W. A21
 Bensley, E. H. A111
 Bertucelli, L. 52
 Bethell, M. F. 53
 Bianchi, G. N. 176
 Bickford, R. G. A99
 Bikeles, G. 133
 Black, G. W. A142
 Black, P. D. 54
 Blandau, R. J. A69
 Blatherwick, C. E. 55
 Bock, E. A20
 Bodson, M. T. A46
 Boje, H. A21
 Bonasegla, F. 110
 Bonnichsen, R. A22 - A23
 Bowditch, M. A24
 Boyd, P. R. A25
 Brenner, C. A26
 Brewer, W. R. 56
 Brickley, W. J. A139
 Brilliant, L. 57
 Broser, F. 58
 Brown, N. W. 59

- Brozovsky, M. 60
- Burgison, R. M. A27
- Burns, B. D. A178
- Butler, T. C. A28
- Byczkowska, Z. A29
- California State Legislation 61
- Canadian Medical Association, Council of
Community Health Care, Special Committee
on Drug Misuse 62
- Carpenter, C. P. A30, A198
- Carr, C. J. A124 - A125
- Castledine, S. A. 71
- Cawte, J. E. 176
- Chalout, L. 63
- Chapel, J. L. 64 - 65
- Charlier, R. A46
- Chenoweth, M. B. A31, A76
- Cherkin, A. A32
- Chin, L. 56
- Chipman, D. W. 84
- Chloroform Committee of the Royal Medical
and Chirurgical Society A33
- Cholak, J. A116 - A117
- Choy, T. A34
- Christiansson, G. 66
- Clayton, J. W., Jr. A35
- Clearfield, H. R. 67
- Clinger, O. W. 68
- Clinton, M., Jr. A36 - A37
- Cohen, H. P. A38
- Cohen, M. I. 147 - 149
- Cohen, M. M. A38
- Colgan, F. J. A63
- Collier, H. A39
- Collom, W. D. 69, 267 - 268, A234
- Conolly, M. E. A54
- Coon, R. A. A191
- Corcoran, A. C. A40
- Corliss, L. M. 70
- Cotter, L. H. A41
- Cottraux, J. 252
- Courtin, R. F. A42
- Courville, C. B. A43
- Cragg, J. 71 - 72
- Cravey, R. H. 49
- Crooke, S. T. 73
- Crotty, J. J. 254 - 256
- Cunningham, J. G. A17
- Curry, A. S. A44
- Cutler, J. T. A45
- Danto, B. L. 74
- Dautrebande, L. A46
- David, M. 75
- Davidson, B. M. A47
- Davies, D. S. A54
- Davies, L. T. A130
- Davies, N. E. A48
- Davis, A. A49
- Davis, P. A. A50
- Davis, R. F. 76 - 77
- Defalque, R. J. A51
- De Lint, J. E. E. 223
- Dendy, R. 154
- Dérobot, M. L. 78
- Desnoyers, Y. A52
- Dietze, H. J. 259
- Dillon, J. B. 79, A53
- Dodd, H. C. A207, A210 - A211
- Dodds, J. B. 80, 161
- Dodson, V. N. 211

- Doll, R. A200
- Dollery, C. T. 81, A54
- Donahue, D. D. A156 - A157
- Done, A. K. 82 - 83, 194 - 196
- Donnelley, J. H. 123
- Downey, J. A. 106
- Doyle, W. E. A55
- Draffan, G. H. A54
- Drinker, P. A56
- Dripps, R. D. A58
- Dudley, S. F. A57
- Duncan, G. M. A161
- Dundee, J. W. A58
- Dunn, R. C. A215
- Durden, W. D., Jr. 84
- Easson, W. M. 85
- Easton, W. H. A59
- Eastwood, D. W. A175
- Edwards, R. V. 86
- Eichert, H. 87
- Elkins, H. B. A24, A60
- Ellison, W. S. 88
- Elosuo, R. 89
- Ely, D. F. 90
- Endicott, K. M. A100
- Erf, L. A. A61
- Erley, D. S. A203 - A205, A207, A209
- Evans, E. A. A164
- Évreux, J. C. 252
- Ewald, C. A. 91
- Falconer, E. H. A62
- Fanning, G. L. A63
- Farrier, R. M. A64
- Faucett, R. L. 92
- Fejer, D. 93 - 94, 224 - 225
- Feldman, R. G. A65
- Ferguson, R. K. A66
- Ferguson, T. A67
- Fine, S. D. A68
- Fink, B. R. A69
- Fischer, H. D. A226
- Fishbein, M. 95
- Forbes, J. R. A70
- Forni, A. A71
- Forrest, J. W. A27
- Foulerton, A. G. R. A72
- Foxell, A. W. H. A73
- Freer, A. B. 96
- Friedländer, J. 97
- Fukui, M. 127
- Fuller, G. C. A74
- Funamoto, H. A237
- Galavotti, B. A75
- Gall, E. A. A139
- Gallina, R. A87
- Garb, S. A76
- Gardner, G. H. A128
- Garrett, G. 98
- Gattner, H. A77
- Gay, H. H. A203 - A205, A209
- Gellman, V. 99
- Gerbis, H. A78 - A79
- Gibson, G. 1
- Giffen, P. J. 223
- Gimenez, E. 186
- Gioscia, V. 100
- Glaser, F. B. 101 - 102
- Glaser, H. H. 103, 160 - 161
- Glatzel, J. 104

- Gold, N. 105
 Goldberg, M. E. A80
 Goldstein, J. 271
 Goldwater, L. A85
 Gonzalez, E. G. 106
 Gonzalez, R. 116
 Goolishian, H. A. 213
 Grabski, D. A. 107
 Grandjean, E. A81 - A83
 Granier-Doyeux, M. 108
 Grant, W. B. 109
 Greenberg, R. A84
 Greenburg, L. A85 - A86
 Greene, C. H. A168
 Grisler, R. A87
 Groce, P. 262
 Grogono, A. W. A88
 Guaraldi, G. P. 110
 Guild, W. R. A89
 Gustafson, R. K. A128
 Gutch, C. F. A90

 Haas, P. A. A81
 Habgood, S. A91
 Hake, C. L. A92, A204 - A205
 Hall, F. B. A93
 Hall, K. D. A94 - A95
 Hamilton, T. D. A67
 Hammes, E. M., Jr. A96
 Hanson, R. C. 111
 Hardin, B. L., Jr. A97
 Hame, W. G. A124
 Harris, L. A. 154
 Harris, W. S. A219 - A220
 Hartwich, G. A98
 Harvey, W. F. A67

 Hathaway, H. R. A146
 Hayama, R. 127
 Heaf, P. A200
 Heimann, H. A86
 Heiniger, H. J. A21
 Heisse, C. K. A27
 Henderson, I. N. A25
 Henrie, J. R. A99, A161
 Heppel, L. A. A100
 Heuser, M. 112
 Heveroch 113
 Hift, W. A101
 Hinckley, R. G. A102
 Hine, C. H. A93, A103 - A104, A164
 Hobby, J. A. E. 180
 Holder, B. B. A207
 Hollenberg, C. H. A111
 Hollingsworth, R. L. A235
 Holstein, E. A105
 Hryniewicz, L. 114
 Hunter, A. R. A106
 Hunter, F. T. A107
 Hurst, G. A44

 Ikeda, M. 115, A108, A217
 Irish, D. D. A1
 Irons, G. V., Jr. A227
 Ishida, K. A237

 Jackson, R. 116
 Jacobs, A. W. A224
 Jacobziner, H. 117 - 120, A109
 Jäger, J. A226
 James, F. M., III A110
 James, M. 154
 James, W. R. L. 121

- Jenkins, L. J., Jr. A171
Jensen, R. A. 92
Joël, E. 122
Johnson, H. E. A80
Johnson, J. 98
Johnson, K. G. 123
Johnson, N. A. 68
Jones, R. A. A171, A191
Jordi, A. 124
Joron, G. E. A111

Kaada, B. R. A6
Kahan, V. L. A112
Karani, V. 125
Karlsson, B. 66, 126
Karno, M. 262
Kashima, T. 127
Kawai, H. 115
Keeler, M. H. 128
Kegel, A. H. A113
Kehoe, R. A. A114 - A117
Kemmer, C. A226
Kent, N. R. A44
Keyserlingk, H., von 129
Kihlbom, M. 130
Killiek, E. M. A118
Kimberg, D. V. 44
Kistler, G. H. A119
Kita, A. A108
Klaassen, C. D. A120
Kleinfeld, M. A121
Klock, M. E. 161
Knabenhans, P. J. 131
Knopfel, H. K. A81
Knox, J. W. 132
Koelsch, F. A122

Körber, M. A216
Korenke, H. D. A123
Kornfeld, S. 133
Kozłowski, P. 4
Kraepelin, E. 134
Kramer, J. P. 135
Kramer, R. A. 136
Krantz, J. C., Jr. A27, A124 - A125
Krug, D. C. 137
Kugelberg, J. 138
Kuniyoshi, M. 115
Kunze, K. A226
Kupperstein, L. R. 139 - 140

Laham, S. A126
Lal, H. A74, A127
Lamson, P. D. A128 - A129
Lang, V. 223
Langrod, J. 141
Larson, R. K. 46
Latta, J. S. A130
Laudel, A. F. A103
Laure, G. A131
Laury, G. V. 142, 192
Law, W. R. 143
Lawrence, J. S. A132
Lawton, J. J., Jr. 144
Lazarew, N. W. A133
Lee, P. A88
Lee, T. 145
LeLievre, R. E. 160 - 161
Leung, K. C. A103
Levy, A. G. A134
Lewis, T. A134
Limonta, A. A71
Lin, S. A38

- Lindström, F. 147
 Lingl, F. A. 247
 Litt, I. F. 147 - 149
 Little, W. T. 150
 Lob, M. A135
 Loskota, W. J. A224
 Louria, D. B. 151
 Luckhardt, A. B. A119
 Luger, M. 152
 Luria, E. 153
 Lurie, J. B. A136
 Lynen, F. K. A183
 Lynn, E. J. 154
 Lyon, J. P. A191

 Machle, W. F. A137 - A138
 MacLean, D. L. A17
 Maehly, A. C. A22 - A23
 Mahler, D. A84
 Maire, E. D. A128
 Malcolm, A. I. 155 - 157
 Mallory, T. B. A139
 Malmquist, C. P. 144
 Malton, S. D. A177
 Man, P. L. 158
 Mark, I. 159
 Markham, E. N. A140
 Marx, A. A186
 Massengale, O. N. 103, 160 - 161
 Masuda, Y. 127
 Mathies, V. 162
 Maxfield, M. E. A176
 May, G. A77
 Mayer, R. F. A65
 Mayers, M. R. A85 - A86
 Mazza, A. A141

 McArdle, L. A142
 McCollister, D. D. A1, A143, A222, A235
 McCord, C. P. A144
 McLaughlin, M. A214
 McLean, A. J. A128
 McLean, J. A. A145
 McNally, W. D. A113
 Meek, W. J. A146
 Meloff, W. A. 163
 Meneghini, R. 153
 Menschik, H. 164
 Merrill, J. P. A89
 Merry, J. 165 - 166
 Meyer, F. M. 167
 Meyer, J. R. A147
 Meyer, S. A148
 Micheels, K. H. A229
 Miller, D. C. A149
 Minot, A. S. A129
 Mitchell, A. B. S. A150
 Mitchell, J. L. A157
 Moe, G. K. A177
 Moeller, M. A22
 Molčan, J. 222
 Monaco, A. R. A157
 Money, J. 176
 Moskowitz, S. A86
 Mueller, G. O. W. 168 - 169
 Müller, J. A151
 Müller, K. A183
 Mullin, L. S. A176
 Mullings, E. B. 170
 Munarini, D. A141
 Münchinger, R. A81
 Musclow, C. E. 171
 Musser, R. A124

- Nagle, D. R. 172
Neal, P. A. A100, A156 - A157
Nelson, E. R. 143
Nelson, J. R. 132
Nevole, S. 173
Newman, M. G. A224
Newman, W. A152
Nitsche, C. J. 174
Noble, W. G. A153
Nomiyam, H. 175
Nomiyama, K. 175
Norris, F. H., Jr. A94 - A95
Nunneley, T. A154
Nurcombe, B. 176
Nylander, I. 137, 177 - 179

O'Brien, E. T. 180
O'Connor, W. A. 181
Oettingen, W. F., von A155 - A158, A215
Ohtsuji, H. 115
Oldham, W. 182
Oldschool, O. 183
Olshan, A. A74
O'Malley, W. E. A27
Orioli, F. L. 187
Orth, O. S. A146
Oyen, F. A222, A235

Pacifico, E. A71
Page, I. H. A40
Page, L. A. 253
Palmer, E. D. A159
Panse, F. A160
Parker, G. 184 - 185
Parkhouse, J. A34, A99, A161

Parmeggiani, L. A162
Parral, J. 186
Parsons-Smith, B. G. A150
Patel, P. L. A101
Patty, F. A. A185
Paul, M. A163
Pearce, S. J. A185
Pearlman, C. A84
Perli, R. M. 187
Perrin, T. L. A100
Pessoa, S. B. A147
Peters 188
Peterson, J. E. A205
Philippot, E. A46
Picchioni, A. L. 56
Pierpaoli, P. 136
Pierson, H. W., Jr. 189
Plaa, G. L. A120, A164
Pleischl, A. A165
Plessner A166
Pohl, K. D. A167
Pohlisch, K. 190
Poindexter, C. A. A168
Polacsek, E. 223
Pope, A. S. A113
Popham, R. E. 223
Porterfield, V. T. A100
Powars, D. 191
Powell, H. A44
Powell, J. F. A91, A169 - A170
Pozzani, U. C. A30, A80
Preble, E. 192
Prendergast, J. A. A171
Press, E. 193 - 197
Preti, L. A172
Pribilla, O. A123

- Pruitt, M. 198
 Przybyłowski, J. A173
 Purchase, I. F. H. A174
 Puri, S. K. A74

 Quintanilla, J. 199

 Raybin, H. W. 117 - 120, A109
 Rector, G. H. M. A175
 Redfern, D. 200
 Rehm, P. 201
 Reifler, C. B. 128
 Reinhardt, C. F. A12, A176
 Reith, J. F. 202
 Rennick, B. R. A177
 Rhoads, C. P. A61
 Rickles, N. K. 203
 Ritti, A. 204 - 205
 Robbins, B. H. A129
 Robertson, D. N. A92
 Robinson, J. F. 174
 Robinson, J. L. 229, 231
 Robson, J. G. A178
 Rogal, O. 206
 Rome, H. P. A161
 Rommeney 207
 Rosenmund, H. A81
 Rosenthal, E. 208
 Rowe, V. K. A1, A92, A209, A222, A235
 Rubin, T. 209
 Ryley, T. G. 157

 Sailer, S. All
 Samples, V. L. 210
 Sanders, L. W., Sr. A179
 Sansom, A. E. A180

 Santostefano, S. 80
 Satran, R. 211
 Sayers, R. R. A184 - A185
 Schafer, L. J. A49
 Schaffer, A. W. A203 - A204, A209
 Schankula, H. J. 223
 Scheble, R. 123
 Scherzer, E. 212
 Schiller, E. 52
 Schilling, R. S. F. A118
 Schiøtz, E. H. A181
 Schlunegger, U. P. A182
 Schmidle, T. A167
 Schmidt, W. 223
 Schmitt, R. C. 213
 Schneck, J. M. 214
 Schonberg, S. K. 149
 Schönenberg, H. A183
 Schönfeld, A. 215
 Schrenk, H. H. A184 - A185
 Schultz, E. W. A186
 Schwanitz, G. A98
 Schwarz, E. A187
 Seccombe, W. 216
 Sedan 217
 Seevers, M. H. A177
 Seifter, J. A188
 Senate of Canada, Archer, A. B., referring, 218
 Sereny, G. 157
 Shah, H. C. A127
 Shanholtz, M. I. 219
 Sharp, B. B. A189
 Shepard, T. H. A69
 Siedlecki, J. T. A190
 Siegel, J. A171, A191
 Sigel, N. B. 46

- Silverglade, A. A192
Silverstein, H. 220
Sioli, F. 221
Sköld, G. 138
Škoricová, M. 222
Smart, R. G. 94, 157, 223 - 225
Smith, A. R. A85
Smith, G. F. A193 - A194
Smith, P. E., Jr. A176
Smith, R. H. A64
Smyth, H. F. A195 - A198
Smyth, H. F., Jr. A30, A80, A195, A198
Sobolevitch, R. H. 226 - 228
Sokol, J. 137, 229 - 234
Souček, B. A199
Speirs, N. R. 235
Speizer, F. E. A200
Spencer, H. C. A1, A143
Spigland, I. 149
Sterling, J. W. 197, 236
Sternner, J. H. A201
Stevens, S. C. A90
Stewart, A. A202
Stewart, R. D. A203 - A212
Stobbe, G. D. A213
Stone, C. S. A103
Stopps, G. J. A12, A214
Storath 237
Strang, L. B. A200
Stüber, K. 238
Susman, R. M. 140
Svetlin, W. 239
Svirbely, J. L. A157, A215
Szadkowski, D. A216
Tabershaw, I. R. A121
Takahashi, S. A237
Takman, J. 130, 240
Tanaka, S. A217
Tapia, F. 48
Tauber, J. A218
Taylor, D. W. 64
Taylor, G. J., IV A219 - A220
Taylor, H. A221
Taylor, R. D. A40
Taylor, W. J. R. 241
Teare, D. 242
Tefferteller, R. 243
Teleky, L. A187
Thamann, F. A116 - A117
Thomas, G. 65
Thomas, L. G. 244 - 245
Thornhill, E. 116
Tichy, F. Y. A13
Todd, J. 246
Tolan, E. J. 247
Tomhave, W. G. A90
Tommasi, M. 251
Torkelson, T. R. A210 - A211, A222
Traeger, A. A223
Trautman, E. C. 248
Triegeer, N. A224
Troisi, F. M. A75
Turrian, V. A81
Unni, V. K. N. A142
Unwin, J. R. 249
Vaille, C. 250
Valaer, P. J. A157
Vallejo, N. 186
Védrinne, J. 251 - 252

- Verhulst, H. L. 253 - 256
- Vernon, R. J. A66
- Vervaeck, L. 257
- Vitani, C. 251
- Vitcha, J. F. A125
- Vlachová, D. A199
- Vliet, A. G. M., van 258
- Voegele, G. E. 259
- Vyskočil, J. A20
- Waggoner, T. B. A92
- Wakasugi, C. 127
- Walker, G. A25
- Wallace, P. 260 - 261
- Waller, A. D. A225
- Walter, R. G. 154
- Walther, H. A226
- Wang, C. C. A227
- Wang, C. S. A159
- Ward, G. W., Jr. A228
- Warren, M. F. A66
- Wecht, C. H. 267 - 268, A234
- Weiler, R. 157
- Weinraub, M. 262
- Weirich, J. A229
- Weitman, M. 123
- Wells, H. S. A128
- Welt, P. J. L. A178
- Whelton, M. J. 263
- White, C. J. A15
- White, J. 225
- Whitehead, P. C. 94, 264
- Wichern, H. 265
- Willcox, W. A230
- Williams, F. M. A54
- Williams, W. L. A231
- Wilson, E. R., Jr. A231
- Wilson, R. 266
- Wilson, R. H. A232 - A233
- Wine, R. L. 123
- Winek, C. L. 69, 267 - 269, A234
- Winick, C. 270 - 271
- Winkler, E. G. 60
- Wintle, F. T. 272
- Witts, L. J. A202
- Wolf, M. A. A235
- Woods, W. W. A236
- Wyld, G. 273
- Yaglou, C. P. A56
- Yanagita, T. A237
- Yant, W. P. A184 - A185
- Yeoman, W. B. 180
- Young, J. V. A89
- Zachariadis, N. 165
- Zapp, J. A., Jr. A12
- Zuidema, H. H. A104

SUBSTANCE INDEX

An alphabetical listing of substances, group names, and products cited in the referenced articles. The prefixed letter A refers to citations appearing in the Appendix.

Note: Hyphens between numbers indicate sequential numbering: 122-125 includes 122, 123, 124 and 125.

Acetates - see also Butyl acetate, Ethyl acetate,
Isoamyl acetate, Methyl acetate, 63, 155,
A158
Acetone - 6, 19, 31 - 32, 45 - 46, 55, 62 - 64,
69 - 70, 73, 75, 82 - 83, 95 - 96, 99, 101,
103, 116, 128, 137, 155 - 157, 159, 170, 173,
191 - 194, 197, 202, 218, 229 - 231, 233 -
234, 249, 253, 268, A13, A22, A44, A76,
A80, A101, A118, A122, A163, A182, A195
Aerosol propellants - see Aerosols
Aerosols - see also Hydrocarbons (fluorinated),
37, 50, 73, 123, 136, 245, A12, A176, A192,
A219, A228
Aerosol sprays - see Aerosols
Airplane cement - see Cements
Airplane glue - see Glues
Alcohol, anhydrous - 25, 64, 70, 73, 101, 103,
137, 156 - 157, 159, 170, 177, 179, 192, 194,
202, 218, 253, 259, A6, A44, A167, A195
Alcohol, denatured - 187
Alcohols - see also Amyl alcohol, Butyl alcohol,
Ethyl alcohol, Isopropyl alcohol, Methanol,
Propyl alcohol, 70, 89, 99, 131, 155, 251,
A233, A237
Amyl acetate - see Isoamyl acetate
Amyl alcohol - 124, 137, A195
Amylene - 265
Aniline - A13, A30
Antitussive aerosol - see Aerosols
Arsine - A148
Benzene - 7, 19, 25, 50, 62 - 64, 69 - 70,
73, 82 - 83, 95 - 96, 99, 101, 103, 122, 124,
134, 137, 151, 153, 155 - 157, 159, 162, 164,
170, 176 - 177, 179, 188, 191, 194, 197, 202,
208, 212, 218, 235, 249, 251, 253, 265,

267 - 268, A3, A5, A13, A19, A21 - A22,
A24, A30 - A31, A61 - A62, A67, A71 - A72,
A75 - A76, A85, A98, A104, A107, A122, A126,
A130, A139, A145, A148, A167 - A168, A184 -
A185, A187, A195 - A196, A201, A215, A218,
A235
Benzol - see Benzene
Butane - A31, A35, A43
Butanol - see Butyl alcohol
Butyl acetate - 46, 64, 70, 89, 96, 101, 103, 124,
128, 130, 137, 159, 202, 218, 253, A6, A118,
A167, A195
Butyl alcohol - 46, 64, 70, 73, 101, 103, 124,
128, 130, 137, 159, 170, 202, 253, A167, A195,
A201
Carbon tetrachloride - 19, 23, 25, 36, 58, 62 -
64, 70, 73, 84, 96, 101, 103, 108, 137, 155 -
157, 192 - 194, 197, 202, 212, 218, 246, 248 -
249, A8, A11, A13, A17, A30 - A31, A36, A40,
A44 - A45, A50, A55, A57, A59 - A60, A64, A68,
A70, A73, A89, A91, A96 - A97, A111, A120,
A123, A128 - A129, A133, A140, A143, A147,
A149, A151, A154 - A155, A164, A168, A171,
A180, A183, A186, A191, A197 - A198, A202,
A213, A225, A229 - A231, A236
Cellulose acetate - 46
Cements - see also Hydrocarbons (aromatic),
Hydrocarbons (chlorinated), 14, 23 - 24, 26 -
27, 30, 34, 48, 55 - 56, 69 - 70, 73, 98, 120,
140, 171, 185, 219, 270
Chlorethyl - see Ethyl chloride
Chlorethane - see Ethyl chloride
Chloroform - 2, 17, 25, 32, 36, 38, 58, 64, 70,
97, 101, 103, 113, 122, 133 - 134, 137, 156 -
157, 172 - 173, 190, 192 - 193, 201 - 202, 212,

- 214 - 215, 218, 234, 237, 239, 253, 259, 262,
273, A2, A9, A13, A23, A31, A33, A44 -
A45, A76, A91, A119 - A120, A133 - A134,
A146, A151 - A152, A155, A164 - A165, A168,
A225, A229, A237
- Cleaning fluid - see Cleaning solvents
- Cleaning solvents - see also Hydrocarbons (chlorinated), 7, 27, 73
- Cocktail glass chillers - see also Freons, 255
- Cryofluorane - 50, 65, 73, A176, A192, A219
- Cyclohexane - 19, 70, 155 - 157, 194, 202,
A104
- Cyclohexanol - 60, 117
- Cyclohexanone - 6, 73, 101, 103, A30
- Cyclopropane - 172, A31, A43, A110, A146
- Degreasers - see also Hydrocarbons (aromatic),
73
- Denatured alcohol - see Alcohol, denatured
- Dichlorodifluoromethane - 49 - 50, 65, 73,
136, 249, A12, A26, A35, A155, A171, A176,
A190, A192, A219
- Dichloroethylene - A27, A171, A190, A229
- Dichloromethane - see Methyl chloride
- 1,2-Dichlorotetrafluoroethane - see Cryofluorane
- Diethyl ether - see Ethyl ether
- Dilutants - see Thinners
- Dimethylmethane - see propane
- Dioxane - A13, A80
- Enamels - 23 - 24
- Enamel thinners - see Thinners
- Ethanol - see Alcohol, anhydrous
- Ether - see also Ethyl ether, 2, 7 - 8, 18, 32,
51, 58, 97, 113, 122, 129, 131, 145, 156 - 157
167, 172 - 173, 181, 183, 190, 192 - 193, 201,
204 - 206, 212, 217, 234, 241, 257, 259, 272,
A13, A33, A44, A76, A119, A146, A165, A223,
A237
- Ethyl acetate - 6, 19, 32, 64, 69 - 70, 75, 96, 101,
103, 128, 130, 137, 148, 156 - 157, 159, 192, 194,
202, 229 - 231, 233 - 234, 253, A37, A163,
A167, A195, A237
- Ethyl alcohol - see Alcohol, anhydrous
- Ethyl chloride - 58, 167, 172, 181, A31, A47, A151,
A176, A190, A229
- Ethylene chloride - see Ethylene dichloride
- Ethylene dichloride - 25, 56, 60, 64, 70, 101, 103,
117, 137, 202, 218, A10, A109, A119, A133
- Ethyl ether - 38, 47, 62 - 64, 91, 101, 137, A58,
A234
- Ethyl glycol monomethyl ether - 56, A30, A172
- Ethyl glycol monomethyl ether acetate - 6, 32, 70,
75, 101, 103, 193 - 194, 229 - 231, 233, 253,
A30
- Fingernail polish remover - 55, 255
- Fluothane - see Halothane
- Freon 11 - see Trichlorofluoromethane
- Freon 12 - see Dichlorodifluoromethane
- Freon 114 - see Cryofluorane
- Freon C318 - see Octafluorocyclobutane
- Freons - see also Cryofluorane, Dichlorodifluoromethane, Octafluorocyclobutane, Trichlorofluoromethane, 22, 156 - 157, 255, A54, A190, A228
- Gasoline - see also Hydrocarbons (aromatic), 9,
20 - 21, 27, 48, 52 - 54, 56, 59, 68, 84 - 86,
88, 92, 105, 109, 125, 140, 143 - 144, 174,
176, 182, 185, 198 - 199, 213, 247, 251, 254 -
255, 259, 270 - 271, A4, A48 - A49, A56, A112,

- A132, A138, A163, A173, A227
- Glues - see also Acetates, Alcohols, Hydrocarbons (aromatic), Hydrocarbons (chlorinated), Ketones, 7, 13, 15, 23 - 24, 26 - 30, 33 - 35, 48, 76 - 77, 82, 88, 90, 93 - 95, 98, 101, 111, 119 - 120, 135, 139 - 142, 149 - 150, 152, 163, 165 - 166, 168 - 170, 184 - 185, 189, 200, 209, 213, 220, 223 - 226, 228, 236, 241, 243 - 244, 250, 254 - 256, 263 - 264, 266, 269 - 271, A102, A220
- Hair lacquer - 251
- Hair shampoo - 50
- Halothane - 11 - 12, 172, A44, A94 - A95, A174, A192, A223
- Heptane - 265, A31
- Hexane - 6, 19, 25, 46, 64, 70, 101, 103, 128, 155 - 157, 192, 194, 202, 218, 265, A31, A104
- Household cement - see Cements
- Hydrocarbons (aliphatic) - see also Petroleum benzin, A4, A23
- Hydrocarbons (aromatic) - see also Benzene, Toluene, Xylene, 105, 139, A4, A22
- Hydrocarbons (chlorinated) - see also Carbon tetrachloride, Chloroform, 1,1,1 - Trichloroethane, Trichloroethylene, 73, 131, A23, A37, A120, A233
- Hydrocarbons (fluorinated) - see also Cryofluorane, Dichlorodifluoromethane, Octafluorocyclobutane, Trichlorofluoromethane, 65, 73, A54
- Hydrocarbons (halogenated) - see also Acetone, Carbon tetrachloride, Chloroform, Cyclohexane, Ethylene dichloride, 70, A151, A155, A164
- Inhalants - see Aerosols
- Isoamyl acetate - 64, 70, 96, 99, 101, 103, 124, 137, 202, A46, A122, A195
- Isopropanol - see Isopropyl alcohol
- Isopropyl acetate - 46, 230
- Isopropylacetone - 6, 32, 64, 70, 75, 101, 103, 116 - 117, 155 - 157, 193 - 194, 202, 229 - 231, 233, 236, 253, A167, A182
- Isopropyl alcohol - 6, 25, 32, 46, 64, 70, 73, 75, 103, 107, 116, 118, 137, 155 - 157, 193 - 194, 202, 218, 229 - 231, 233, 253, A30, A182
- Kerosene - see Kerosine
- Kerosine - 56, 64
- Ketones - see also Acetone, Cyclohexanone, Methyl ethyl ketone, Methylisobutyl ketone, 25, 70, 73, 131, A233
- Lacquer - 23 - 24, 226, 271, A122, A195
- Lacquer thinners - see Thinners
- Laughing gas - see Nitrous oxide
- Lighter fluid - see also Hydrocarbons (aliphatic), 7, 27, 88, 185, 200, 213, 270
- Marking pencil - 24, 88
- Methanol - 32, 137, 156 - 157, 193 - 194, 234, 259, A13, A167
- Methyl acetate - 137, A13, A167
- Methyl alcohol - see Methanol
- Methyl cellosolve - see Ethylene glycol monoethyl ether
- Methyl cellosolve acetate - see Ethylene glycol monoethyl ether acetate
- Methyl chloride - A13 - A14, A31, A113, A120, A133, A155, A189 - A190, A229
- Methylchloroform - see 1,1,1 - Trichloroethane

- Methylene chloride - 64, 193, A31, A35, A39
 Methylene dichloride - see Methylene chloride
 Methyl ethyl ketone - 6, 32, 64, 70, 96, 101, 103, 107, 128, 137, 155 - 157, 193 - 194, 202, 253, A30, A182
 Methyl isobutyl ketone - see Isopropylacetone
 Methyl propyl ketone - 64, 137
 Model airplane cement - see Cements
 Model airplane glue - see Glues
 Model cement - see Cements
 Nail polish remover - see also Acetates, 63, 150, 185, 200
 Naphtha - see Petroleum benzin
 Naphthalene - A13, A148
 Nasal inhalants - see Aerosols
 Nitrobenzene - A108, A196
 Nitrous oxide - 2, 3, 7, 11 - 12, 57, 74, 79, 98, 154, 156 - 157, 167, 172 - 173, 181, 192, 241, 273, A7, A32, A34, A42 - A43, A63, A69, A84, A99, A161, A175, A178, A224
 Octafluorocyclobutane - 65, A176
 Paint - see also Acetates, 23, 63, 271
 Paint thinner - see Thinners
 Pentane - 265, A3
 Perchloroethylene - see Tetrachloroethylene
 Petroleum benzin - 1, 7, 19, 62 - 64, 82 - 83, 95, 99, 101, 155 - 157, 170, 186, 194 - 195, 197, 227, 249, A19, A24, A131, A168
 Plastic cement - see Cements
 Plastic glue - see Glues
 Plastic model cement - see Cements
 Polystyrene plastic cement - see Cements
 Propane - A35, A43, A125, A176, A190
 Propyl alcohol - 156 - 157, 194
 Propylene - 265, A125
 Solvents - 55, 120, 196, 223 - 225, 241
 Spot remover - see also Hydrocarbons (chlorinated), 73, 147, 255
 Tetrachloroethane - A122, A151, A155, A164, A229
 Tetrachloroethylene - 155 - 157, 194, 197, A30, A80, A120, A155, A164, A203 - A204, A208, A210, A164, A229
 Tetrachloromethane - see Carbon tetrachloride
 Tetraethyllead - A25, A112, A114 - A117, A137, A179
 Thinners - see also Acetates, 23 - 24, 27, 55, 62 - 63, 89, 126 - 127, 130, 140, 146, 158, 175, 177 - 179, 185, 213, 226, 240, 270
 Toluene - 5 - 7, 16, 19, 25, 32, 37, 42, 50, 55 - 56, 60 - 64, 66, 69 - 70, 73, 75, 80, 82 - 83, 89, 95 - 96, 99 - 101, 103, 107, 112, 116 - 118, 124, 128, 130, 132, 137, 151, 155 - 162, 170, 175 - 177, 179 - 180, 191 - 195, 197, 202 - 203, 210 - 211, 216, 218, 222, 227, 229 - 234, 245, 249, 253, 260 - 261, 267 - 268, A6, A13, A19, A22, A24, A30 - A31, A37, A67, A71, A77, A86, A104, A118, A122, A126, A131, A135 - A136, A148, A153, A156 - A157, A160, A163, A182, A187, A195 - A196, A215, A218 - A220, A232, A235, A237
 Toluol - see Toluene
 Trichloroethane - see 1,1,1 - Trichloroethane
 1,1,1 - Trichloroethane - 6, 50, 73, 102, 147 - 148, 194, A30, A74, A92 - A93, A120, A127, A155, A164, A171, A177, A191, A206, A209, A212, A222
 1,1,2 - Trichloroethane - see 1,1,1 - Trichloro-

ethane

Trichloroethanol - 217

Trichloroethylene - 4, 6, 10, 36 - 37, 40 - 41,
43 - 44, 55, 60, 64, 67, 71 - 73, 75, 78, 87,
104, 107, 110, 114 - 115, 117, 121, 124, 131,
138, 147 - 148, 153, 155 - 157, 171 - 172, 181 -
182, 203, 207, 212, 222, 229 - 231, 233, 238,
251 - 252, 258, A1, A10, A13, A15 - A18, A20,
A23, A28 - A30, A34, A37 - A38, A41 - A42,
A44, A51, A53, A58, A65 - A66, A78 - A83,
A87, A90 - A91, A105 - A106, A120 - A121,
A124, A141 - A142, A144, A150, A155, A162,
A164, A166, A169 - A171, A181, A188, A191,
A193 - A194, A199, A203, A205, A214, A216 -
A217, A221, A229

Trichlorofluoromethane - 49 - 50, 65, 73, 136,
A35, A54, A176, A190, A192, A219

Trichloromonofluoromethane - see Trichloro-
fluoromethane

Tricresyl phosphate - see Tritotyl phosphate

Tritotyl phosphate - 23, 46, 70, 101, 103, 125,
202, A13

Varnish - see also Acetates, 108, A46

Vinyl chloride - 50

Xylene - 7, 25, 32, 46, 64, 70, 73, 75, 99,
101, 103, 116, 128, 137, 162, 170, 193, 202,
229 - 231, 233, 235, 253, A13, A19, A22,
A31, A104, A118, A126, A131, A135, A148,
A160, A187, A195 - A196, A218, A235

Xylol - see Xylene

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